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GROUND WAVE EMERGENCY NETWORK
FINAL OPERATIONAL CAPABILITY

**ENVIRONMENTAL ASSESSMENT
FOR
SOUTHEASTERN IDAHO RELAY NODE
SITE NO. RN 8W927ID**

19 February 1993

Electronic Systems Center
Air Force Material Command, USAF
Hanscom AFB, Massachusetts 01731-1623

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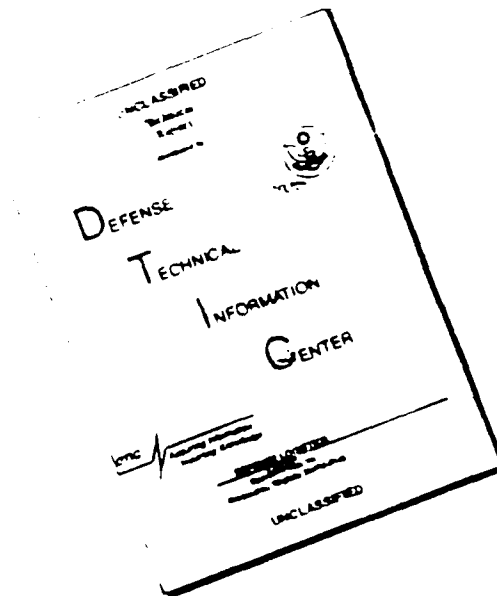
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NAME OF ACTION: GROUND WAVE EMERGENCY NETWORK
SOUTHEASTERN IDAHO RELAY NODE

DESCRIPTION OF PROPOSED ACTION ALTERNATIVES:

The U.S. Air Force plans to construct a radio communications relay node in southeastern Idaho (Bingham County) as part of the Ground Wave Emergency Network (GWEN) communications system. Six action alternatives associated with six candidate GWEN sites (CGSs) in southeastern Idaho and the no action alternative have been considered and evaluated in an environmental assessment (EA).

GWEN is a radio communications system designed to relay emergency messages between strategic military areas in the continental United States. The system is immune to the effects of high-altitude electromagnetic pulse (HEMP) energy surges caused by nuclear detonations in the ionosphere that would disrupt conventional communications equipment. A failure of such equipment would prevent timely communications among top military and civilian leaders and strategic Air Force locations and prevent U.S. assessment and retaliation during an attack. GWEN is an essential part of a defense modernization program to upgrade and improve our nation's communications system, thereby strengthening deterrence.

The GWEN system is a network of relay nodes, receive-only stations, and input/output stations. The relay node in southeastern Idaho would be part of the Final Operational Capability (FOC) phase of the GWEN system and would establish essential links with adjacent nodes in the network.

In September 1987, the U.S. Air Force Electronic Systems Division, Hanscom Air Force Base, Massachusetts published a Final Environmental Impact Statement (FEIS) for the GWEN FOC that addressed the system as a whole and identified expected environmental effects common to all sites. Section 5 of the FEIS described a siting process that is designed to minimize the potential for environmental impacts. This process has three distinct phases: network definition, regional screening, and individual site evaluation. Network definition identified the need for a relay node in southeastern Idaho. Regional screening resulted in the identification of six CGSs in southeastern Idaho that met the exclusionary and evaluative criteria described in that FEIS. Individual site evaluation examined the relative suitability of the CGSs through site-specific technical studies. The EA is a part of the third phase and is tiered from that FEIS. It addresses the potential environmental effects of the six action alternatives and the no action alternative.

The proposed relay node in southeastern Idaho will be an unmanned facility located on approximately 11 acres of land and, once constructed, will resemble an AM radio broadcast station. The facility will consist of a 299-foot-tall, low-frequency (LF) transmitter tower, three equipment shelters, an access road, and associated fences. The tower will be supported by 24 guy wires, including 12 top-loading elements. An equipment shelter at the tower base will contain an antenna tuning unit. An 8-foot-high chain link fence topped with barbed wire will surround the tower base and associated equipment shelter. A radial ground plane, composed of 60 to 100, 0.128-inch-diameter copper wires buried about 12 inches underground, will extend out about 330 feet from the tower base. A 4-foot-high fence will be installed around the perimeter of the copper radials.

A second equipment area located at the site perimeter will contain two shelters housing a back-up power group (BUPG) with two internal fuel storage tanks and radio processing equipment. The BUPG will operate during power outages and for testing purposes. An LF receive antenna, consisting of a pair of 4-foot-diameter rings mounted on a 10-foot pole, and an ultrahigh-frequency (UHF) antenna, used for communicating with airborne input/output terminals and consisting of a 9-foot-high whip-like antenna mounted on a 30-foot-high pole, will also be located in this area. An 8-foot-high chain link fence topped with barbed wire will enclose the entire equipment area. A 10-foot-wide gravel road will connect this area to the tower base. A 12-foot-wide gravel road will provide access to the site from a public road.

The station will use existing commercial three-phase electric power and telephone service. Power and telephone service will be brought to the site through either overhead or buried lines, depending on local utility practices. In its ready status, the antenna will transmit in the LF radio band at 150 to 175 kilohertz for a total of 6 to 8 seconds per hour.

Four of the six action alternatives are discussed in the Finding of No Significant Impact (FONSI). Because of significant impacts on historic properties and visual impacts to travel routes leading to historic properties, the Bingham County (CGS-2) and Kelly (CGS-10) sites will not be considered in this FONSI.

ANTICIPATED ENVIRONMENTAL EFFECTS

The EA evaluated potential impacts to the physical, biological, and socio-cultural environment from construction and operation of the relay node.

The project would have no significant impacts on physical resources. Erosion and increased runoff would be minimized by using proper erosion control techniques during construction and by replanting the site afterwards. Impacts to mineral resources would be minor. Paleontological resources are not likely to occur on any of the sites; therefore significant impacts to them are not anticipated. No prime farmland would be removed from production. Water quality would not be significantly affected because increases in copper concentrations due to corrosion of the ground plane would be negligible. Air quality would not be significantly affected. During construction, temporary and insignificant increases in emissions would occur, and during operation, emissions from the BUPG would not be sufficient to result in violation of air quality standards.

The project would have no significant impacts on biological resources. The sites are used for agricultural purposes and do not contain sensitive wildlife habitat. None of the sites is within 300 feet of wetlands and none is within a 100-year floodplain. Informal consultation with the U.S. Fish and Wildlife Service indicated that the project would not affect any threatened or endangered species. The Idaho Department of Fish and Game indicated that no state-listed rare, threatened, or endangered species or unique biological communities are known to occur on any of the sites. Bird-tower collisions may occur but would not be significant because the tower would be located away from primary bird habitats and migration routes.

The project would have no significant impacts on socio-cultural resources. Construction would have a small, beneficial impact on the local economy, in part by providing temporary employment for contractors and construction workers. Community support systems would not be significantly affected. Land use and noise impacts would not be significant. The relay node signal would not interfere with commercial television or radio broadcasts, amateur radio operations, garage door openers, or pacemakers. Radio-frequency emissions outside the fenced area around the tower base would not pose a health hazard to humans or animals. The Idaho State Historical Society was consulted and concurred that the project would not affect significant cultural resources. Significant impacts to Native American traditional, religious or sacred sites are not anticipated. A visual analysis conducted in accordance with the criteria developed in the FOC FEIS concluded that the relay node facility would not cause significant visual impacts.

CONCLUSIONS:

No significant impacts to the surrounding environment would be caused by construction and operation of the proposed relay node on the Webb (CGS-14), Watt (CGS-15), Murdock (CGS-22), or Jensen (CGS-23) site. Therefore, an environmental impact statement for a GWEN relay node at the cited locations in southeastern Idaho is not required.



David O. Williams, Colonel, USAF
Chairman

HQ ESC Environmental Protection Committee

4 Mar 93

Date

PREFERRED GWEN SITE REPORT SOUTHEASTERN IDAHO

The U.S. Air Force is proposing to construct a relay node for the Ground Wave Emergency Network (GWEN) in Southeastern Idaho. The Air Force has followed the siting process described in Section 5 of the Final Environmental Impact Statement (FEIS) for the Final Operational Capability (FOC) phase of the GWEN program to identify alternative Candidate GWEN sites (CGSs). The six CGSs identified in Southeastern Idaho are referred to as the Bingham County, Kelly, Webb, Watt, Murdock, and Jensen sites.

This Preferred GWEN Site Report (PGSR) summarizes the process of selecting the preferred site from among the six CGSs. This PGSR, along with a site-specific Environmental Assessment (EA) and Finding of No Significant Impact (FONSI), is being distributed for information and comment in compliance with the Air Force's process of Interagency and Intergovernmental Coordination for Environmental Planning (IICEP).

Operational, environmental, and developmental suitability; construction and real estate acquisition costs; and public comments and concerns are all factors which have been considered in arriving at the selection of the preferred site.

Without an **operationally suitable** location, connectivity of the relay node in Southeastern Idaho to the GWEN network cannot be achieved. Ground conductivity measurements are acceptable at all six sites. During site-specific studies, no radio frequency interference was detected in GWEN frequency bands which would interfere with the operation of the GWEN receiver. Also, operations at either site would pose no interference with other known systems. UHF line-of-site coverage for a potential airborne interface would be uninhibited at either of the six sites. Therefore, all six sites are operationally suitable.

The next major factor considered in selecting the preferred site is **environmental suitability**. The environmental suitability of each CGS was determined from information provided by an independent field analysis and is documented in the EA. The EA for the six CGSs was completed in February 1993. The EA determined that significant visual impacts to properties determined eligible for listing on the National Register of Historic Places would occur if the site were constructed on the Bingham County or Kelly site. Based on the EA of the four remaining CGSs, the Air Force has concluded that no significant environmental impacts would occur at either the Webb, Watt, Murdock, or Jensen sites. A FONSI for those four sites was completed on 4 March 1993. Thus, those four sites are environmentally suitable.

All six CGSs are suitable for development as a GWEN relay node. The FAA has approved construction of the GWEN relay node at either of the six CGSs. Construction cost varies only slightly between the six sites due to the proximity of access road, three phase power, and telephone access at each site. Although construction cost is lowest at the Jensen site, all sites are developmentally acceptable.

The final consideration as to the preferred GWEN site is the **real estate acquisition**. The Air Force has obtained lease options on the Watt and Jensen sites. The Jensen site provides the lowest overall lease cost and therefore, the Watt agreement was discontinued.

With operational factors acceptable, environmental factors weighed, and developmental factors and acquisition costs considered, the Air Force prefers the Jensen site. The Jensen site is preferred because it ranks best overall among the previously mentioned criteria including lowest overall construction and acquisition costs.

Therefore, I have selected the Jensen site as the Air Force's preferred site for development as the GWEN relay node in Southeastern Idaho. After reviewing the information received during the IICEP process, I will prepare for construction of the relay node.


STEPHEN T. MARTIN, Lt Col, USAF
Program Manager, GWEN

15 March 93

(Date)

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SUMMARY

The Ground Wave Emergency Network (GWEN) is a radio communication system designed to relay emergency messages between strategic military areas in the continental United States. The system is immune to the effects of high-altitude electromagnetic pulse (HEMP) energy surges caused by nuclear bursts in the ionosphere that would disrupt conventional communications equipment such as telephones and shortwave radios. A failure of such equipment would prevent timely communications among top military and civilian leaders and strategic Air Force locations and prevent U.S. assessment and retaliation during an attack. GWEN is an essential part of a defense modernization program to upgrade and improve our nation's communications system, thereby strengthening deterrence.

The GWEN system consists of a network of relay nodes, receive-only stations, and input/output stations. Each relay node, such as the one proposed in southeastern Idaho, consists of a guyed radio tower facility similar to those used by commercial AM broadcast transmitters.

A Final Environmental Impact Statement (FEIS) for the GWEN Final Operational Capability (FOC) was published in September 1987 by the Electronic Systems Division, Hanscom Air Force Base, Massachusetts. That FEIS addressed the GWEN system as a whole, identifying expected environmental effects common to all sites. Section 5, beginning on page 5-1 of the FEIS, describes a siting process that is designed to minimize the potential for environmental impacts. This process has three distinct phases: network definition, regional screening, and individual site evaluation.

Phase 1, network definition, identified the geographic coordinates that met the operational needs and technical constraints of the network. Each set of coordinates became the center of a circular site search area (SSA) with a 9-mile radius (250 square miles). The SSA discussed in this Environmental Assessment (EA) was centered 0.7 mile north of the village of Rockford, in Bingham County, southeastern Idaho, at latitude 43.20° N and

longitude 112.53° W. The principal communities in the SSA are Moreland and part of Blackfoot.

Phase 2, regional screening, involved the application of exclusionary and evaluative criteria to the SSA to avoid environmentally sensitive areas. The remaining areas, called potential areawide sites (PAWS), became the focus of the siting process. A field investigation for southeastern Idaho was conducted in April 1990. Twenty-three sites were identified during automobile-based surveys as potential candidate GWEN sites (PCGSs). Attempts were made to contact the owners of the sites to determine their interest in selling or leasing land to the Government. Rights-of-entry were granted to investigate fourteen PCGSs. Following evaluation against the environmental siting criteria set forth in the FEIS, six of the fourteen PCGSs were recommended as candidate GWEN sites (CGSs) for further review. One of the CGSs (CGS-2) is owned by Bingham County. These CGSs were described in the Preliminary Site Evaluation Report (PSER) of June 25, 1990.

Phase 3, individual site evaluation, involves evaluating the relative suitability of the candidate sites through site-specific technical studies. This EA is a product of those evaluations and discusses the six siting alternatives in southeastern Idaho. It addresses only those criteria that apply to the candidate sites. The seventh alternative, no action, would impair performance of the GWEN system but leave the environment unchanged.

To be suitable for construction and operation, a site should measure at least 700 by 700 feet (approximately 11 acres), be relatively level and undeveloped, be free of natural or man-made obstructions, and have soils capable of supporting relay node structures. The site should also be close to all-weather roads, commercial three-phase power, and telephone lines to minimize costs. To operate effectively, the site must be located at least a minimum distance from obstructions that could affect reception and transmission. These include buildings and towers, high-voltage power lines, and other communications systems or sources of radio-frequency interference. Specific minimum distances depend on height and power levels of identified obstructions or interfering sources.

This EA shows that construction and operation of a GWEN relay node on the Bingham County (CGS-2) or Kelly (CGS-10) site would have significant impacts on historic properties and significant visual impacts to travel routes leading to historic properties. These impacts are discussed in Sections 4.2 and 4.3 of this EA.

The project would have no significant impacts if built on the Webb (CGS-14), Watt (CGS-15), Murdock (CGS-22), or Jensen (CGS-23) site. During the 6-week construction period, the project would cause temporary and insignificant air quality and noise impacts and slight increases in traffic. It would have a small, beneficial impact on the local economy, in part because it would provide temporary employment for contractors and construction workers. If built on any of the above four sites, the project would have no significant impacts on air quality; water quality; land use; mineral resources; known paleontological resources; biological resources, including threatened and endangered species; or cultural resources that are listed, eligible, or potentially eligible for listing on the National Register of Historic Places. Visual impacts would not be significant. Radio-frequency emissions outside the fenced area around the tower base would not pose a health hazard to humans or animals.

1.0 PURPOSE AND NEED FOR ACTION

The proposed action covered by this Environmental Assessment (EA) includes construction and operation of a relay node of the Ground Wave Emergency Network (GWEN) in southeastern Idaho (see Figure 1.1 of this EA). This relay node will provide essential connections with adjacent nodes in the network. The major features of a GWEN relay node and associated environmental impacts common to all sites are addressed in the Final Environmental Impact Statement (FEIS) for the Final Operational Capability (FOC) phase of GWEN, which was published in September 1987 by the Electronic Systems Division, Hanscom Air Force Base, Massachusetts. This EA is tiered from that FEIS and addresses site-specific conditions at the candidate GWEN sites (CGSs) for this particular site search area (SSA).

The purpose of GWEN is to provide to the President and the National Command Authority a strategic communications network that is immune to the effects of high-altitude electromagnetic pulse (HEMP) and will carry critical attack warning and force execution data. As a result, GWEN will remove any possibility of potential aggressors taking advantage of the electromagnetic pulse generated by a high-altitude nuclear burst. A HEMP surge would disrupt the nation's electric power line transmission capability, cripple electronic devices, and adversely affect skywave communications networks based on conventional electronics. GWEN provides a low-frequency (LF) ground wave communication network that will not be affected by HEMP effects. It thereby strengthens deterrence by removing the option of beginning an attack against the United States by using HEMP effects.

A partial GWEN network, called the Thin Line Connectivity Capability (TLCC), has been completed. It contains 8 input/output stations, 30 receive-only stations, and 54 relay nodes. The TLCC provides a limited level of HEMP-protected communications to strategic forces and the National Command Authority.

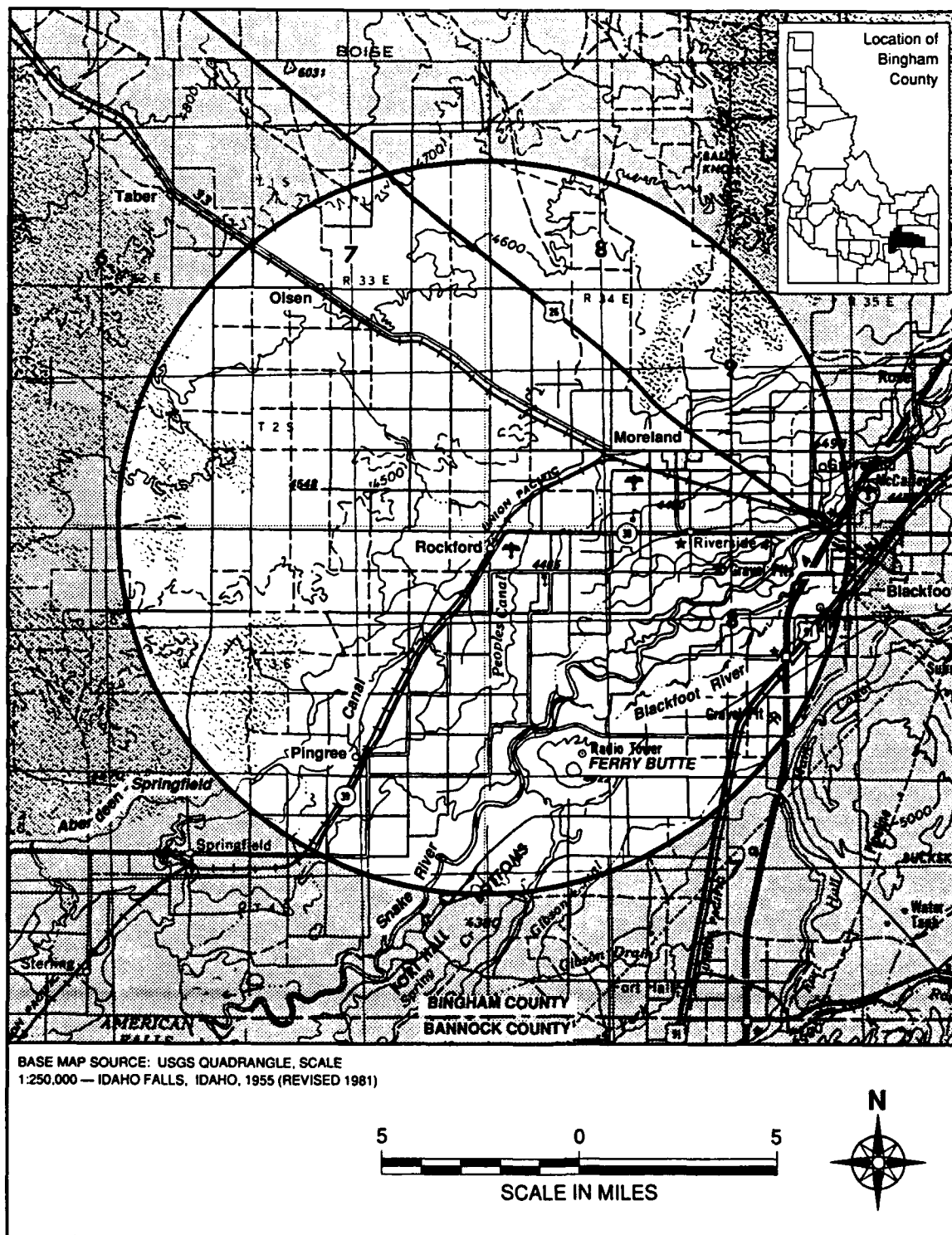


FIGURE 1.1 SOUTHEASTERN IDAHO SITE SEARCH AREA (SSA), BINGHAM COUNTY, IDAHO

The FOC phase of GWEN will add 29 relay nodes. The FOC will allow communication along several routes, thereby enhancing system availability and ensuring that vital communications will be maintained.

2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

The six action alternatives are site-specific applications of the standard relay node design presented in the FEIS. Consequently, they share a number of features that are discussed in Section 2.1 of this EA. The site-specific features are discussed in Sections 2.2 through 2.7 of this EA. Site descriptive data were obtained during field investigations conducted in April 1990. Figure 2.1 of this EA shows the six CGSs in relation to the major features of the SSA. Figure 2.2 and Appendix B of this EA show the locations of the CGSs in relation to roads and surrounding topography, respectively.

2.1 Common Features of the Action Alternatives

2.1.1 Site Selection Process

The process used to select sites is described in Section 5, beginning on page 5-1 of the FEIS. This process has three distinct phases: network definition, regional screening, and individual site evaluation. Appendix A of this EA provides a diagram of the site selection process. The environmental criteria used in this process are defined in Tables 5-1 and 5-2, pages 5-7 through 5-14 of the FEIS.

Phase I, network definition, involved locating network nodes to optimize their performance while serving a predetermined number of users. A typical GWEN ground wave has an effective range of about 150 to 200 miles. Thus, relay nodes could not be located independently; changing the location of one would affect the connectivity with other nodes in the network. Once the optimal coordinates of the relay nodes were identified, a 9-mile-radius SSA was defined around each point to provide suitable opportunity for siting a relay node near that point. The 9-mile radius was chosen because it provided a reasonably sized search area consistent with the technical constraints on the relay node. If a significant portion of an SSA fell within an environmentally highly sensitive area such as a national park or wilderness area, an alternative was selected and its connectivity evaluated. This process was repeated until all relay nodes fell outside such areas.

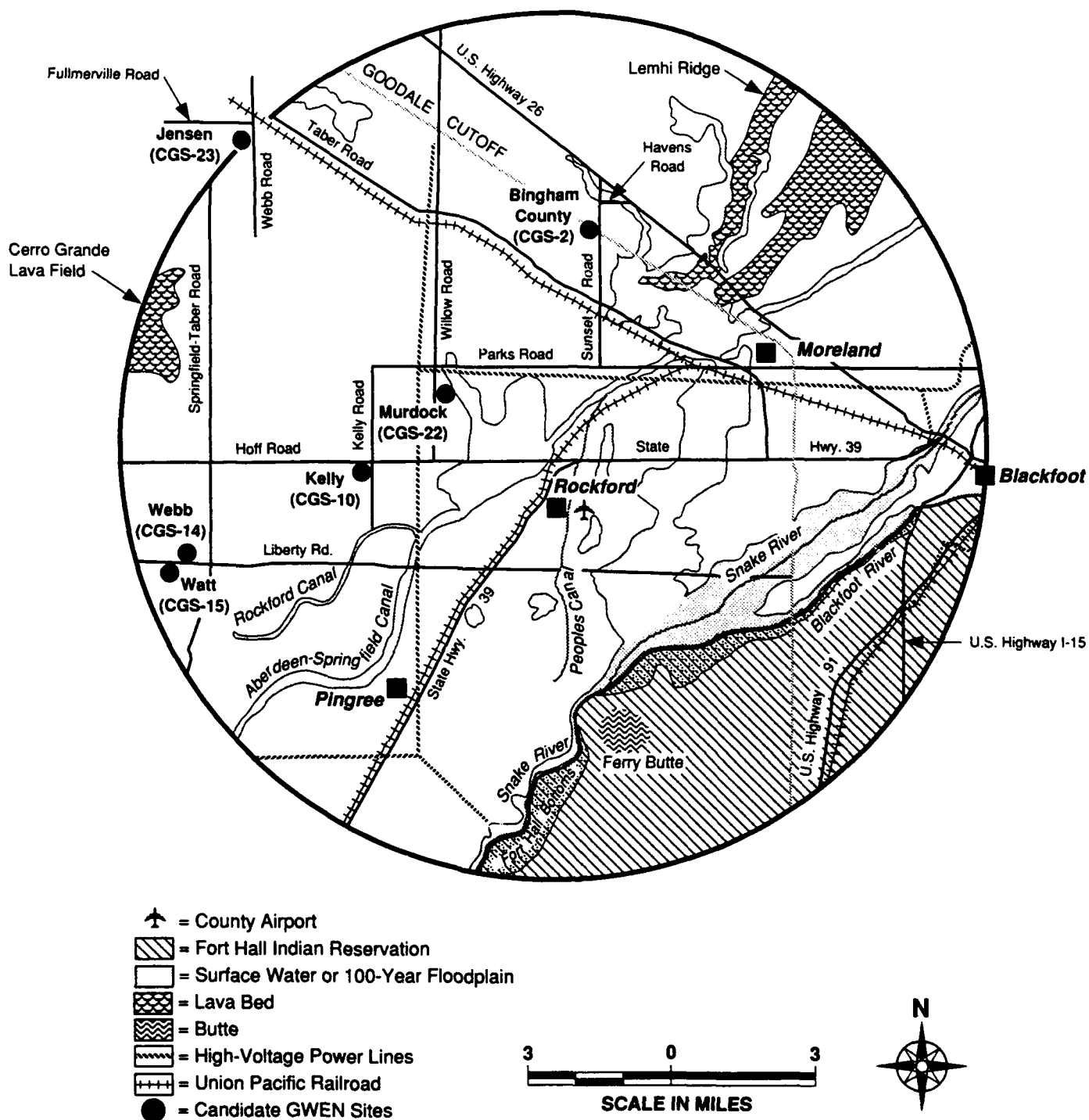


FIGURE 2.1 LOCATIONS OF CANDIDATE GWEN SITES (CGSs) RELATIVE TO SELECTED MAJOR FEATURES AND ROADS WITHIN THE SOUTHEASTERN IDAHO SITE SEARCH AREA

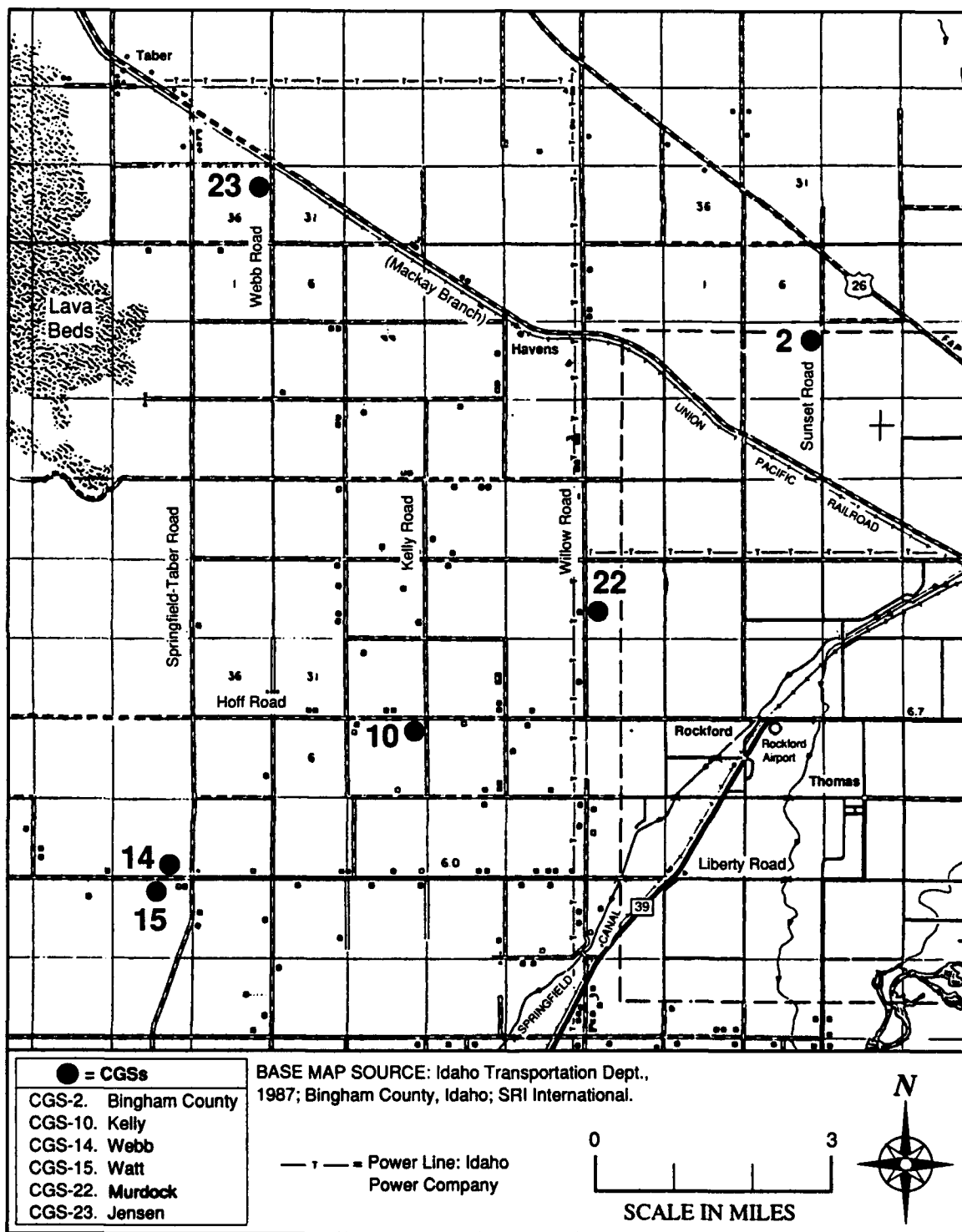


FIGURE 2.2 LOCATIONS OF CANDIDATE GWEN SITES (CGSs) IN BINGHAM COUNTY

Phase 2, regional screening, involved the application of exclusionary and evaluative criteria to the SSA to identify areas that might contain operationally acceptable sites outside environmentally sensitive areas. The resulting search areas, called potential areawide sites (PAWS), were submitted to appropriate federal, state, and local officials for review. The PAWS were then redefined, as appropriate, by incorporation of the comments of the reviewers, and a field investigation was conducted to find suitable candidate sites for a GWEN relay node within the redefined PAWS.

A field investigation for southeastern Idaho was conducted in April 1990. Twenty-three sites were identified during automobile-based surveys as potential candidate GWEN sites (PCGSs). Attempts were made to contact the owners of the sites to determine their interest in selling or leasing land to the Government. Rights-of-entry were granted to investigate fourteen PCGSs. Following evaluation against the environmental siting criteria set forth in the FEIS, six of the fourteen PCGSs were recommended as CGSs for further review. One of the CGSs (CGS-2) is owned by Bingham County.

Phase 3, individual site evaluation, of which this EA is a part, is then used to determine the relative suitability of the candidate sites through site-specific technical studies. This EA presents the results of the environmental portions of those studies and covers site-specific impacts associated with construction of a relay node in southeastern Idaho. These are summarized in Sections 4.2 through 4.7 of this EA. The findings of this EA and site-specific studies of operational parameters will be used to select a preferred GWEN site (PGS).

2.1.2 Relay Node Construction and Operation

A typical relay node site is located on approximately 11 acres of land (see Figure 2.3 of this EA). It is an unmanned facility consisting of a 299-foot-tall, three-sided, 2-foot-wide LF transmitter tower, three equipment shelters, an access road, and associated fences. The tower has a base insulator and lightning protection and is supported by 24 guy wires, including 12 top-loading elements to further strengthen the signal and provide additional structural support.

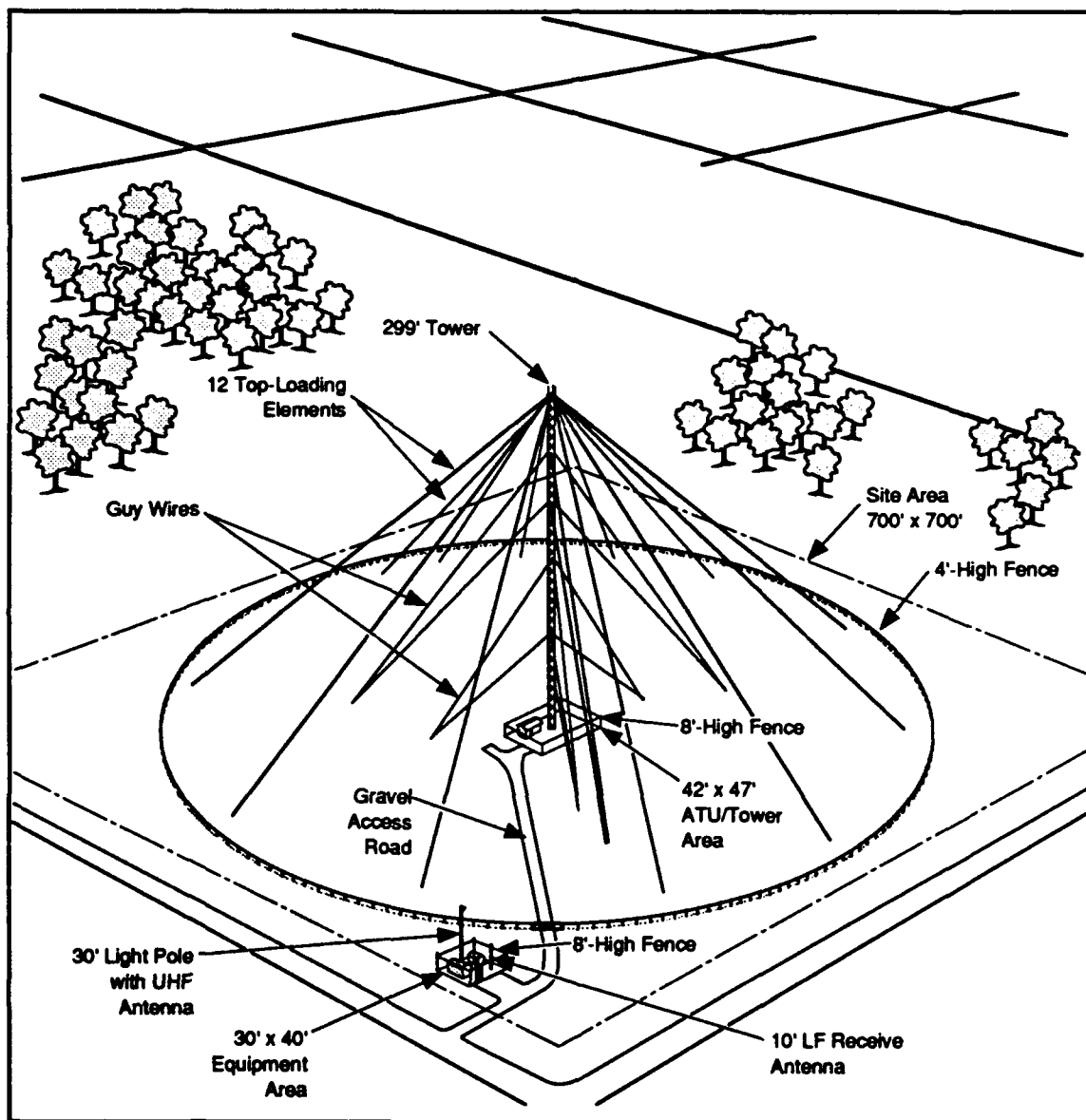


FIGURE 2.3 TYPICAL LAYOUT OF FOC RELAY NODE STATION

These guy wires and top-loading elements are attached to the tower and 18 buried concrete anchors. The sizes of these anchors and their depth of burial varies with local soil and bedrock properties. However, the guy-wire anchors typically are rectangular blocks buried 5 feet below the surface. If bedrock occurs at or near the surface, the anchors are special rock-embedded rods. The tower base is concrete with a cross-section area resembling an inverted T. The size of this foundation is determined by soil conditions.

A radial ground plane, composed of 60 to 100 buried copper wires, extends out from the base of the tower. Each wire is 0.128 inch in diameter, about 330 feet long, and buried approximately 12 inches underground. The ground plane helps to strengthen the broadcast signal, and the number and length of the wires depend on the soil conductivity at the site. A 4-foot-high fence is installed around the perimeter of the ground plane to protect the ground plane and guy anchors and to prevent inadvertent exposure to electric shock resulting from the buildup of static electric charge.

In addition to the main tower, the relay node has two other antennas. One is an LF receive antenna made up of a pair of 4-foot-diameter rings mounted on a 10-foot pole. The second is an ultrahigh-frequency (UHF) antenna used for communicating with airborne input/output terminals. It is a 9-foot-high whip-like antenna mounted on a 30-foot-high pole. Both antennas are located within the equipment area at the perimeter of the site, which is enclosed by an 8-foot-high fence.

The siting and design of the tower are coordinated with the Federal Aviation Administration (FAA) to ensure compliance with FAA standards and regulations. The tower is equipped with a white strobe light at the top, which emits 40 flashes per minute and is rated at 20,000 candelas for daytime and twilight use and 2,000 candelas for nighttime use. To minimize glare at ground level, the light is focused upward and horizontally outward.

GWEN operates intermittently in the LF radio band at 150 to 175 kilohertz (kHz). For comparison, the low end of the AM band for commercial broadcasts is 530 kHz. The peak broadcast power for each GWEN tower is from 2,000 to 3,000 watts, depending on local soil conditions. In its ready status, GWEN typically transmits between 6 and 8 seconds per hour. GWEN does not interfere with commercial television, radio broadcasts, amateur radio operations, garage door openers, or pacemakers, as noted in Section 2.1.1.1, page 2-3 of the FEIS.

All equipment shelters are anchored to concrete pads. One shelter, located at the base of the tower, houses the antenna tuning unit (ATU). Two other shelters are located side by side in the equipment area enclosed at the perimeter of the property. One houses radio processing equipment, and the other houses a 70-horsepower, backup diesel generator and two aboveground fuel tanks. The generator operates 2 hours per week for testing purposes and during power outages. Locked, 8-foot-high chain link fences topped with barbed wire secure the equipment shelter areas at the base of the tower and at the perimeter of the site to provide safety and to inhibit unauthorized entry. A 12-foot-wide gravel road provides access to the equipment area enclosure at the perimeter of the property. A 10-foot-wide gravel road leads from the equipment enclosure to the tower.

Fuel is stored in two aboveground steel tanks inside the generator shelter. Tank capacities are 559 gallons and 461 gallons. Each tank pipes fuel separately to the backup power group (BUPG) and is equipped with two outlet shut-off valves, one controlled manually and one controlled automatically. If a leak occurs, fuel will flow into a floor drain leading to a tightly capped pipe extending outside the BUPG. Once approximately 2 gallons of fuel accumulate in the pipe, a "liquid spill" signal is sent to the GWEN Maintenance Notification Center, which will dispatch maintenance personnel. However, if a leak were not detected, an explosion inside the shelter would be extremely unlikely due to the high flash point of diesel fuel. If a tank at the GWEN station failed, the entire contents of one tank could be released and contained inside the BUPG shelter. Refer to Section 4.12.1.1, beginning on page 4.12-1 of the FEIS for further discussion on diesel fuel spills and leaks.

The station uses existing commercial three-phase electric power and telephone service, but does not require water, septic, or sewer systems. Power and telephone service are brought to the site through either overhead or buried lines depending on local utility practices. Power and telephone service are generally brought underground from the site boundary to the equipment shelter area.

Temporary increases in air pollutant emissions will occur during construction, primarily from greater use of heavy machinery than is required in normal farming operations. Emissions resulting from operations of the facility will be limited to the operation of the BUPG, which will operate only 2 hours every week for testing purposes and for additional periods as required during power outages. Thus, the generator will operate for a total of 152 hours per year, if commercial power outages totaled 48 hours. If the generator runs at 100 percent load during the projected 152-hour operating time, total emissions in one year will be less than 350 pounds per pollutant, as documented in Section 4.3.1, beginning on page 4.3-1 of the FEIS.

Noise levels generated by construction equipment are discussed in Section 4.5.1.1, beginning on page 4.5-1 of the FEIS. Under worst-case assumptions, levels could reach 78 dBA at the site boundary from on-site activity and 92 dBA at distances of 50 feet from equipment installing the off-site access road. Noise generated during GWEN operation would come from the BUPG, which will operate only 2 hours per week and during commercial power outages. The BUPG will be located at least 50 feet within the site boundary with its exhaust side oriented toward the tower area. Noise levels due to intermittent operation of the BUPG will be less than 72 dBA at the site boundary, which is within the standards typically set for lands under agricultural use (70 to 75 dBA). At 50 feet beyond the site boundary, the noise level would drop below 65 dBA, which is within the standards typically set for residential and mixed residential/agricultural use (55 to 65 dBA). These noise levels and standards are discussed in Section 3.5.3, page 3.5-2 and Section 4.5.1, pages 4.5-1 through 4.5-6 of the FEIS.

Construction will require as many as 20 workers at any given time and take about 6 weeks. Standard earth-moving and erection equipment will be used, as detailed in Table 2-1, page 2-14 of the FEIS. Erosion control techniques that are consistent with local practices

will be used during construction. Grading and vegetation removal at any of the CGSs will be minimal. The site will be replanted after construction is finished.

After construction is completed, personnel requirements will be limited to periodic maintenance by a contractor who will service the equipment, cut the surface growth, remove snow from the access road, and perform other services, as needed. Security services will be arranged with local authorities. The projected life of the facility is 15 to 25 years. Upon decommissioning, the tower and other structures will be removed, as discussed in Section 2.1.4, page 2-18 of the FEIS.

2.2 Alternative 1: Bingham County Site (CGS-2)

The Bingham County site is 10 feet west of Sunset Road (County Road 1100W) and approximately 900 feet south of Havens Road (County Road 500N), in the northeast quarter of the northeast quarter (NE1/4 NE1/4) of Section 7, Township 2S, Range 34E. The access road would be from Sunset Road and would be 10 feet long.

Three-phase power would be obtained from overhead lines 40 feet east of the site across Sunset Road. Telephone lines would be connected to an underground cable at the same location.

Appendix B, Figure B.1 of this EA, provides a map showing the surrounding topography.

2.3 Alternative 2: Kelly Site (CGS-10)

The Kelly site is 17 feet south of Hoff Road and 16 feet west of Kelly Road (County Road 1600W), in Lot 1 of the NE1/4 NE1/4 of Section 5, Township 3S, Range 33E. The access road would be from Hoff Road and would be 17 feet long.

Three-phase power would be obtained from overhead lines approximately 45 feet north of the site across Hoff Road. Telephone lines would be connected to an underground cable adjacent to the site on the west side of Kelly Road.

Appendix B, Figure B.2 of this EA, provides a map showing the surrounding topography.

2.4 Alternative 3: Webb Site (CGS-14)

The Webb site is 12 feet north of Liberty Road (County Road 200S) and approximately 790 feet west of Springfield-Taber Road (County Road 1900W), in the SE1/4 SE1/4 of Section 11, Township 3S, Range 32E. The access road would be from Liberty Road and would be 12 feet long.

Three-phase power would be obtained from overhead lines adjacent to the site on the north side of Liberty Road. Telephone lines would be connected to an underground cable 49 feet south of the site across Liberty Road.

Appendix B, Figure B.3 of this EA, provides a map showing the surrounding topography.

2.5 Alternative 4: Watt Site (CGS-15)

The Watt site is 14 feet south of Liberty Road (County Road 200S) and 0.2 mile west of Springfield-Taber Road (County Road 1900W), in the NW1/4 NE1/4 and NE1/4 NE1/4 of Section 14, Township 3S, Range 32E. The access road would be from Liberty Road and would be 14 feet long.

Three-phase power would be obtained from overhead lines 52 feet north of the site across Liberty Road. Telephone lines would be connected to an underground cable adjacent to the northern boundary of the site on the south side of Liberty Road.

Appendix B, Figure B.4 of this EA, provides a map showing the surrounding topography.

2.6 Alternative 5: Murdock Site (CGS-22)

The Murdock site is 14 feet east of Willow Road (County Road 1400W) and 0.5 mile south of Parks Road (County Road 200N), in the SW1/4 NW1/4 and NW1/4 SW1/4 of Section 26,

Township 2S, Range 33E. The access road would be from Willow Road and would be 14 feet long.

Three-phase power would be obtained from overhead lines adjacent to the western boundary of the site on the east side of Willow Road. Telephone lines would be connected to an underground cable at the same location.

Appendix B, Figure B.4 of this EA, provides a map showing the surrounding topography.

2.7 Alternative 6: Jensen Site (CGS-23)

The Jensen site is 7 feet west of Webb Road (County Road 1800W) and 620 feet south of Fullmerville Road (County Road 700N), in the NE1/4 NE1/4 of Section 36, Township 1S, Range 32E. The access road would be from Webb Road and would be 7 feet long.

Three-phase power would be obtained from overhead lines adjacent to the southern boundary of the site. Telephone lines would be connected to an underground cable adjacent to the eastern boundary of the site on the west side of Webb Road.

Appendix B, Figure B.4 of this EA, provides a map showing the surrounding topography.

2.8 No Action Alternative

The no action alternative is deletion of the southeastern Idaho relay node from the GWEN network. Adoption of this alternative would mean a consequent degradation in the performance of the system due to a lack of connectivity to other nodes in the system.

3.0 AFFECTED ENVIRONMENT

This section discusses the environmental setting of the proposed GWEN project in southeastern Idaho. Section 3.1 of this EA describes the general characteristics of the SSA, and Sections 3.2 through 3.7 of this EA describe the unique characteristics of each CGS within the SSA. Site descriptive data were obtained during field investigations conducted in April 1990. U.S. Geological Survey 7.5 minute topographical maps were used as data sources for distances, physiographic features, and topography (USGS, 1971a-c, 1973a-b, 1974, 1979a-d, and 1980).

3.1 Site Search Area

Presented below is information on the physical, biological, and socio-cultural settings of the SSA.

3.1.1 Physical Setting

The SSA in southeastern Idaho is a circular, 250-square-mile area in Bingham County, centered 0.7 mile north of the village of Rockford, in the Columbia River Plateau section of the Intermountain Plateaus physiographic province of the United States. The topography of the SSA is generally flat, with slight surface variations. The principal topographic features are Ferry Butte, in the south, and the Snake and Blackfoot rivers, which flow through the southeastern quarter of the SSA. The Aberdeen-Springfield Canal runs from the southwest to the northeast, passing near the SSA center.

Geologically, the Columbia River Plateau is underlain by layers of sedimentary rock and terrestrial volcanic rock of the Quaternary period, formed 2 million to 5 million years ago. Massive lava flows occurred throughout the Snake River Plain of southern Idaho during this period, some as recently as the Holocene epoch (within the last million years). The SSA's flat, basalt lava formation is covered by windblown sediment that forms a gently rolling surface topography with frequent lava outcroppings. This area of gently rolling hills is bordered by the Snake River alluvial plains, the more recent basalt flows of the Cerro Grande lava field, which enters the SSA at the western boundary, and the Lemhi Ridge

lava flow that extends into the northeastern portion of the SSA (Chance, 1990; Lindholm, 1981).

Historically, southeastern Idaho has been seismically active. Earthquakes have been associated with faults within the Snake River basalt lava formation that formed from previous lava eruption zones and from bedrock faults north and south of the lava plain. In 1940 an earthquake of Modified Mercalli (MM) intensity II was centered 21 miles south of the SSA center, and in 1964 a small earthquake of undetermined MM intensity was centered 6 miles north. In 1983, three earthquakes with MM intensities as high as IX were centered 78 miles northwest of the SSA center and resulted in two deaths and major damage to 11 businesses and 39 homes, with damages totaling \$12.5 million. Earthquakes of this magnitude can cause widespread ground cracking, collapse of masonry buildings, shifting of wood-frame structures off foundations, and breaking of underground pipes (Howard *et al.*, 1978; Kinney, 1966; Stover *et al.*, 1986). Minor earthquakes can be expected to result from movement along small faults within the basalt flows of the plain but would not be expected to cause significant damage unless structures were directly above the fault zones and surface rupture occurred (Manitakos, 1989).

No minerals or ore reserves of commercial value exist in Bingham County. Small quantities of gravel and sand are quarried in the SSA, primarily for local highway and road construction. Quarry operations are conducted on privately owned land and are not foreseen as a growth business (Johnstone, 1990).

Paleontological resources are not expected to occur on any of the CGSs. In the area of the SSA, west of the Snake River, the chemical composition of the soil and the basalt geological base tend to increase the decaying process of bones and fossils. Consequently, the discovery of paleontological resources during site construction is highly unlikely (Akerston, 1990).

Soils within the SSA are generally level to moderately sloping, with bedrock at least 20 inches below the surface. The soils on all the CGSs are in the Pancheri-Polatis soil association, either Pancheri silt loam or Polatis silt loam, occurring on basalt plains with occasional basalt lava outcroppings. Irrigated Pancheri and Polatis soils are used for hay,

pasture, small grains, sugar beets, and potatoes; when nonirrigated they are used for range and for small grains. These soils are moderately well drained, moderately to strongly alkaline (pH 7.9 to 9.0), and have a depth to the seasonally high water table greater than 5 feet. The water erosion hazard is slight to moderate. The moderate wind erosion hazard is primarily associated with nonirrigated cropland and livestock grazing. Neither of these soils is designated as hydric (SCS, 1987) and neither is classified as prime farmland (SCS, 1973). Lava rock, a miscellaneous land type made up of lava flows and a small mixture of Pancheri and Polatis soils, supports little, if any, vegetation and is used for limited grazing (SCS, 1973). The specific soils on each CGS are identified in Sections 3.2 to 3.7 of this EA.

The Snake River basin is the primary drainage system for southeastern Idaho. The Snake River and its principal tributary, the Blackfoot River, flow southwesterly, forming smooth and nearly flat alluvial terraces. The Snake River is the primary water resource within the SSA, and few other creeks or streams flow through the region (SCS, 1973). The Aberdeen-Springfield Canal, a large irrigation project constructed in the late 1890s, runs northwest of, and parallel to, the Snake River. The CGSs are above the alluvial part of the Snake River Plain (Chance, 1990) and are not within the river's 100-year floodplain, with the exception of a corner of the Murdock site (CGS-22) (FIA, 1979). The distances from each CGS to the nearest surface water or wetlands are given in Sections 3.2 through 3.7 of this EA.

Groundwater in southeastern Idaho occurs in the joints and fractures of the underlying bedrock. Aquifers underlying Bingham County are composed chiefly of basaltic rocks with lesser amounts of unconsolidated sedimentary rocks. The availability of the water varies, depending upon the geologic formation that holds it. Areas of unconsolidated sedimentary rocks along the Snake River are the main aquifers supplying water resources to Bingham County (Whitehead, 1984). Groundwater is of good quality (Lindholm, 1981).

The climate of Bingham County is characterized by hot, dry summers and cold, windy winters with occasional heavy snow. Temperature records show average annual extremes of 96°F and -19°F. The average weekly temperatures show a fairly smooth transition from a low point in mid-January to a peak in mid-July, but marked deviations

from the average may be experienced in any year. The average annual rainfall in the SSA is 7 inches, with the greatest concentration between the months of April and June. Average annual snowfall in the SSA is 25 inches, concentrated between the months of December and February. The almost constant winds often cause precipitation to evaporate before reaching the ground, and snow tends to drift rather than form a uniform ground cover (Chance, 1990). The growing season, the period between the last freezing temperature recorded in the spring and the first in fall, averages 110 days (SCS, 1973).

Air quality in the area is good and does not exceed the National Primary and Secondary Ambient Air Quality Standards, which have been adopted by the State of Idaho (Idaho Code, Section 39-101). Bingham County is in attainment for all those standards (McGowan, 1990). Air quality standards are discussed in Section 3.3.3, pages 3.3-1 to 3.3-7 of the FEIS.

3.1.2 Biological Setting

Vegetation in the SSA is characteristic of a high prairie desert—mainly sagebrush, rabbitbrush, cheatgrass, squirreltail, bluebrush, wheatgrass, saltgrass, and greasewood. These species, as well as saltbrush and small cacti, constitute the primary indigenous vegetation of the CGSs. Low precipitation permits few native tree stands in the SSA, although species of cottonwood and willow grow along the Snake River floodplains. Russian olive and black locust are also common in parts of the SSA as farmstead windbreaks, but they are not indigenous. The areas around the CGSs are flat and treeless. A limited area of marsh along the Snake River supports sedges, rushes, and water-tolerant grasses. Lava flow areas are essentially bare and topographically uneven, with vegetation consisting of sparse stands of sagebrush and stunted juniper (SCS, 1973).

Common mammals in Bingham County include rabbit, groundhog, coyote, and, occasionally, bobcat. Beaver and muskrat are common along streams and creeks in the southern portion of the SSA. Larger animals, such as deer, elk, and bear, are occasionally seen within the SSA; however, they generally inhabit the more mountainous and vegetatively dense environments of the Blackfoot Mountains, approximately 20 miles east of the Snake River and the SSA (SCS, 1973).

Game bird populations are large and include chukar, duck, goose, ring-necked pheasant, blue grouse, sage grouse, gray partridge, and mourning dove. Nongame birds common to the area include the American robin and a variety of songbirds that feed on seeds, grains, insects, worms, and fruit. Local birds that feed almost entirely on fish, frogs, insects, rodents, or snakes include various species of flycatcher, hawk, heron, and swallow. Migratory birds such as cranes, raptors, and waterfowl pass through Bingham County along the Snake River flyway (SCS, 1973).

All permanent streams, ponds, and lakes in the SSA are suitable for fish. The principal species are trout, which thrive best in streams that are adequate in size, have gravel bottoms, and are unpolluted. Many of the larger streams are regularly stocked with trout (SCS, 1973).

Few wetland areas exist in the SSA because of the region's arid climate. The *Federal Manual for Identifying and Delineating Jurisdictional Wetlands* (GPO 1989-236-985/00336) states that an area must meet three criteria to be designated as a wetland: hydric soils; hydrophytic vegetation; and wetlands hydrology, which includes a shallow water table and standing water for at least 7 days of the growing season (FICWD, 1989). This manual was used as the basis for wetland determination. Based on field investigations (Kroupa, 1990), wetlands maps provided by the USFWS (Appendix C, Lobdell, 1990, pages C-4 through C-9 of this EA), and soils data (SCS, 1973; SCS, 1987), none of the CGSs meets these three criteria, nor do the areas within 300 feet of the CGSs. The most notable wetland is the northern portion of the Fort Hall Bottoms, at the base of Ferry Butte on a floodplain adjacent to the Snake River in the southern part of the SSA. This wetland area is approximately 8 miles southeast of the nearest CGS.

The SSA has no wildlife refuges or protected wildlife habitats, other than a bald eagle roost in the southern portion of the SSA (Toweill, 1990). Springfield Bird Haven, a state wildlife management area also known as the Sterling Management Area, is outside the SSA, approximately 6 miles south of the closest CGS (Watt, CGS-15).

In compliance with Section 7 of the Endangered Species Act of 1973, as amended (16 United States Code [USC] 1531, *et seq.*, at 1536), a list of threatened and endangered species was requested during informal consultation with the U.S. Fish and Wildlife Service (USFWS). The USFWS stated that no threatened or endangered species occur near the project area (Appendix C, Lobdell, 1990, pages C-3 through C-9 of this EA; Appendix C, Lobdell, 1992, pages C-14 to C-16 of this EA). According to the latest list, no threatened or endangered species occur near the project area. However, one candidate for federal listing, the pygmy rabbit (*Brachylagus idahoensis*), could occur near the CGSs.

The pygmy rabbit is essentially a species of the deserts of the Great Basin, although it requires relatively moist soils in which to make its burrows. It is chiefly nocturnal but may be seen throughout the day. At least 600 acres of habitat are needed to sustain a breeding population, although its home range is generally within 30 yards of its burrow. It feeds primarily on sagebrush, and breeds from May through August (Burt and Grossenheider, 1976; Ransom, 1981; Thomas, 1979). The sagebrush habitat for the pygmy rabbit is absent from all the CGSs, which are all agricultural fields.

In addition, the Idaho Department of Fish and Game (IDFG) indicated that the bald eagle (*Haliaeetus leucocephalus*), a federally listed endangered species, is a transitory inhabitant of the SSA. The IDFG identified the Snake and Blackfoot rivers as critical flyways for this migratory bird; a bald eagle roosting site occurs at the junction of the two rivers (Toweill, 1990). No CGS is within 6 miles of the rivers or of the identified bald eagle roosting site, and, because of the arid terrain, the eagles generally do not venture far from the rivers' shores (SCS, 1973). Subsequent consultation with the USFWS established that although bald eagles might migrate through parts of the SSA, they are too far from the CGSs to merit being listed by the USFWS as an endangered species in the project area (Appendix C, Lobdell, 1991, page C-10 of this EA).

No state-listed threatened or endangered plant or animal species or species of special concern to the IDFG occurs in the SSA (Conley, 1990). The IDFG identified a grassy shrub (*Lesquerella kingii* var *conbrensis*) that the Bureau of Land Management (BLM) considers sensitive and that occurs in Rockford County (Toweill, 1990). Consultation with the Idaho

Natural Heritage Program determined that this species does not occur within 1 mile of any CGS (Stevens, 1990).

3.1.3 Socio-Cultural Setting

Most of the prehistoric archaeological information on southeastern Idaho comes from excavations of rock shelters or caves and indicates that human habitation of the general area began more than 14,000 years ago. The areas near the CGSs were not hospitable to prehistoric residence, since they have no ridges, groves of native trees, springs, or streams that could have provided protection or incentive for native peoples to linger or camp. These areas would, however, have been within daily foraging range of the more hospitable Snake River alluvial plain to the southeast, which had water, good grass, and willow and cottonwood trees. Most prehistoric archaeological work in the region has focused on rock shelters, but current work at the Wahmuza site, just south of the SSA on the Fort Hall Indian Reservation, involves a stratified open village site on bluffs overlooking the Snake River (Chance, 1990).

The Shoshoni inhabited southeastern Idaho in the early eighteenth century. Near the middle of the century, horses were introduced from the Spanish areas of the present Southwest, and with horses the Shoshoni were able to form their small, scattered bands into tribes. They were joined by another tribe, the Bannock, and began to travel greater distances, crossing the Continental Divide to hunt buffalo on the Great Plains (Chance, 1990).

On August 12, 1804, Captain Meriwether Lewis became the first Euro-American to reach Idaho, in pursuit of a safe passage through the Pacific Northwest (Fisher, 1989). The fur trade opened in southeastern Idaho with the establishment of Fort Henry, northeast of the SSA near the Idaho/Wyoming border, in 1810 (Chance, 1990). In 1834, Nathaniel Wyeth of the Columbia River Fishing and Trading Company built Fort Hall on the Snake River just southwest of the city of Blackfoot. He later sold the fort to the Hudson Bay Company, who maintained it as a trading post until the 1840s when profitability of fur trading declined (Fisher, 1989). The Fort Hall Indian Reservation was established in 1867 and was first

occupied in late 1868; in 1905 the acreage was substantially reduced (Chance, 1990). The reservation occupies 33 square miles in the SSA.

The 1846 treaty with Great Britain that gave ownership of the Pacific Northwest Territory to the United States opened the way for thousands of settlers to move beyond the Rocky Mountains. But even though the Oregon Trail went through the southern part of Idaho, the arid climate discouraged most pioneers from settling in the area. The Mormons were among the first to settle in Idaho, though it was the discovery of gold along the Snake River in southwestern Idaho in the 1860s that brought the greatest number of people. Idaho's first permanent Euro-American settlement, Franklin, was formed in 1860. The Idaho Territory created in 1863 included all of Idaho, Montana, and most of Wyoming; the boundaries were redrawn in 1868 to form Idaho's present shape. With the introduction of the railroad in 1875 and the development of irrigated agricultural methods, Idaho became a more desirable place in which to live and was admitted to the Union as the forty-third state on July 3, 1890 (Fisher, 1989).

The Carey Act of 1894 created large and enduring irrigation developments in Idaho. Two of these projects were the Aberdeen-Springfield Canal, which runs southwest to northeast through the SSA, and the Peoples Canal, which runs from the south to join the Aberdeen-Springfield Canal north of Rockford. These irrigation canals, however, could not provide water for the higher terrain to their west and northwest, where the CGSs are located. That higher desert-like area remained uncultivated and unsettled until the Enlarged Homestead Act of 1909 was enacted to allow larger homesteads on arid land, in order to open vast areas to dry farming. In good years homesteaders could grow grain and sometimes potatoes without irrigation, by plowing deeply and by planting a field every other year (Chance, 1990).

The relatively wet years between 1910 and 1918 permitted successful dry farming, but a drought in 1919 forced many farmers to give up their homesteads. Sheep ranchers purchased much of this abandoned homestead land and began drilling deep, and expensive, irrigation wells through the underlying basalt. This encouraged another influx of homesteaders in the late 1940s and 1950s (Chance, 1990).

The only previously recorded historic property within the SSA is Goodale's Cutoff (Appendix C, Green, 1990, page C-11 of this EA). Several cutoffs, or shortcuts, to the Oregon Trail passed through the project area, and they are collectively known as Goodale's Cutoff. These trails were used by fur traders, overland emigrants, and, later, miners and stagecoach traffic. The identification of Goodale's Cutoff as eligible for listing on the National Register of Historic Places (NRHP) reflects a substantial interest within the state in documenting overland emigration trails (Chance, 1990). The Idaho State Historic Preservation Officer (SHPO) was consulted, as required by the National Historic Preservation Act (16 USC 470, *et seq.*) and recommended that an archaeological survey and a historic structures survey be conducted for all CGSs (Appendix C, Green, 1990, pages C-11 and C-12 of this EA).

A Phase I archaeological survey was conducted in early November 1990 by a professional archaeologist qualified in the State of Idaho. Each site was surveyed using pedestrian transects at 30-meter (100-foot) intervals. No archaeological resources were observed on any of the sites (Chance, 1990).

For reasons discussed in Section 4.8.1.3, beginning on page 4.8-2 of the FEIS, and in Section 4.1.3 of this EA, historic properties within 1.5 miles of the CGSs are potentially subject to adverse visual impacts from the relay node facility. In early November 1990 a Phase I historic structures survey was conducted for each site. The survey determined that a segment of Goodale's Cutoff and two structures are eligible for listing on the NRHP. The northern alternate to Goodale's Cutoff of the Oregon Trail passes within 1.5 miles of the Bingham County site (CGS-2). A long, though interrupted, segment of this trail was identified during the historic structures survey, and setting is considered important to its eligibility, as discussed in Section 3.2 of this EA. Two other alternate routes of Goodale's Cutoff are within the SSA, but neither of these is considered eligible for the NRHP (Chance, 1990). The two eligible structures are the Jensen farmstead and the Dygert log cabin, both within 1.5 miles of the Kelly site (CGS-10). Setting is considered important to their NRHP eligibility (Chance, 1990), as discussed in Section 3.3 of this EA.

In compliance with the American Indian Religious Freedom Act of 1978 (42 USC 1996), the Bureau of Indian Affairs (BIA) and the Idaho SHPO were consulted in order to locate tribes associated with the project area (Davis, 1992; James, 1992). According to the BIA, the only federally recognized tribe living in the area of the SSA is the Shoshoni-Bannock tribe in Fort Hall, Idaho. The Idaho SHPO confirmed that the Shoshoni-Bannock tribe in Fort Hall was the only tribe associated with the project area. The tribe was notified, the GWEN project was explained, and information was requested regarding traditional, religious, or sacred sites located within the SSA. The tribe's environmental coordinator determined that the construction of a GWEN facility on any of the six CGSs would not be likely to have an impact on Native American resources or significant religious grounds in the area (Albrecht, 1991).

Land use in Bingham County is primarily agricultural. In 1982 approximately 75 percent of the land area was used for agricultural purposes (Census Bureau, 1988). Most crops are sprinkler-irrigated by either a circular pivot or lateral method, and the most prominent cash crops are potatoes, sugar beets, alfalfa, and wheat. Small grains and hay are also common but are generally grown on less fertile soils than other crops demand. Lava rock areas and nonirrigated portions of the SSA are used for range and livestock grazing. Areas that have good agricultural soils and only scattered patches of lava outcroppings are generally cultivated around the obstructions (Kroupa, 1990). Bingham County is not comprehensively zoned and all of the CGSs fall within agricultural zoning districts (Baker, 1990). At the time of the field investigation, all the CGSs were planted with potatoes, winter wheat, or alfalfa (Kroupa, 1990).

The main highway of the region is U.S. Highway I-15, which runs north-south through the southeastern edge of the SSA. U.S. Highway 26 runs northwest-southeast through the northeastern portion of the SSA and intersects U.S. Highway I-15 at Blackfoot. West of this intersection, State Highway 39 runs west toward the SSA center and then turns south. Numerous county roads crisscross the area, following the section lines (Chance, 1990). The SSA is also served by the Bingham County Airport, just east of the village of Rockford. A Union Pacific Railroad line runs from Blackfoot toward the northwest, roughly parallel to U.S. Highway 26; another line branches to the south near Moreland and closely parallels

the southwestern segment of State Highway 39; a third line parallels U.S. Highway 91 in the southeastern portion of the SSA.

Sources of ambient noise are limited primarily to the operation of farm equipment and to traffic. As described in Section 3.5.3, beginning on page 3.5-1 of the FEIS, local ordinances typically set maximum noise level limits at 70 to 75 dBA for land under agricultural use. However, rural portions of Bingham County, such as those areas in which the CGSs are located, do not have a local noise ordinance (Baker, 1990).

The 1986 population of Bingham County was 38,300, a 5 percent gain from 1980. The largest population concentration (10,065) is in the city of Blackfoot. The only other substantial residential communities within the SSA are the towns of Moreland (400), Pingree (125), and Rockford (100). Per capita personal income for Bingham County residents was \$8,481 in 1984, lower than both the state level of \$10,146 and the national level of \$12,772. Agriculture is the dominant industry within the county, especially the cultivation, dehydration, and wholesale trade of potatoes. Crops represent 62 percent of the cash value of agricultural products, and livestock represents 38 percent. The unemployment level in Bingham County averaged 9.8 percent of the civilian labor force in 1986, higher than the state level of 8.7 percent and the national level of 7 percent for the same year (Census Bureau, 1988).

No state or federal parks or recreational facilities exist within the SSA. The American Falls Reservoir, approximately 3 miles southwest of the SSA boundary, is popular with residents throughout southeastern Idaho for boating and water sports (IDC, 1989).

The visual setting of the SSA is a combination of natural and rural elements. The topography is flat and barren with only slight variations and little vegetation. The landscape consists primarily of farmland and cattle range with few structures or watercourses and little vegetation. The Snake River, with its broad alluvial plain, winds through the southeastern portion of the SSA no closer than 6 miles to any of the CGSs. Ferry Butte, in the southern portion of the SSA, rises approximately 300 feet above the plateau. Complexity of the skyline, as defined in Section 4.8.1.3, page 4.8-10 of the FEIS, varies from low in rural areas to moderate in the urban area of Blackfoot. Man-made

structures, such as farm buildings and the telephone and power poles and lines along roadsides, generally dominate the region's natural features, except in areas along the Snake River where more stands of cottonwood and willow and more topographical variations occur.

3.2 Alternative 1: Bingham County Site (CGS-2)

The Bingham County site is relatively flat with an overall slope between 1 and 2 percent. Soils on the site are a combination of Pancheri and Polatis silt loams, which are described in Section 3.1.1 of this EA.

The nearest surface water is an intermittent stream 1,000 feet west of the site. Small areas of lava outcropping occur in the southern portion of the site and alfalfa has been cultivated around them. The surrounding vegetation is agricultural or native sagebrush and grasses. There are no trees on or around the site.

The northern alternate to the Goodale's Cutoff of the Oregon Trail is considered eligible for listing on the NRHP and lies 1,200 feet northwest of the CGS center (see Figure 3.1 of this EA). The nearest portion of the trail (Segment A) has been plowed over but remains discernible; the next segment (Segment B) has also been plowed and is only a shadow. Segment C is well preserved, with actual ruts worn into the basalt bedrock by iron-shod wagon wheels. The trail is associated with events that have made a significant contribution to the broad patterns of the country's history, and setting is important to its eligibility for the NRHP because of the uncompromised nature of the natural rural landscape. The only man-made elements that intrude upon the open vistas in the vicinity of the trail are power poles and lines (Chance, 1990).

The nearest residential community is Moreland, 4 miles southeast.

3.3 Alternative 2: Kelly Site (CGS-10)

The Kelly site is level. The Pancheri silt loam soil on the site has the same characteristics as the combination Pancheri-Polatis silt loam described in Section 3.1.1 of this EA.

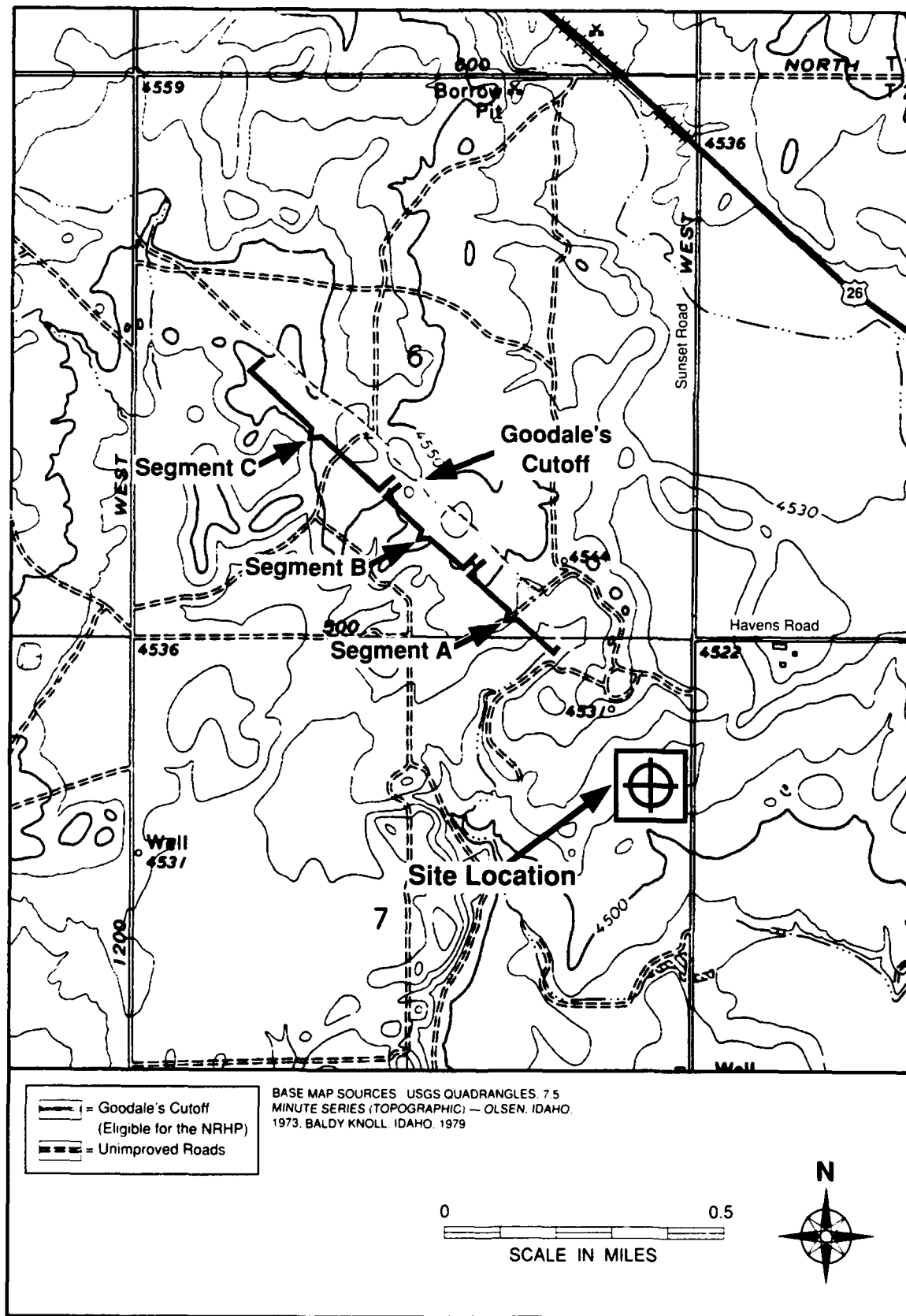


FIGURE 3.1 LOCATION OF PROPERTY THAT IS ELIGIBLE FOR LISTING ON THE NATIONAL REGISTER OF HISTORIC PLACES WITHIN 1.5 MILES OF THE BINGHAM COUNTY SITE (CGS-2)

The nearest surface water is a wetland 0.2 mile southwest of the site. The Rockford Canal is 2.2 miles southeast. The site is on land used for growing alfalfa, and the surrounding vegetation is agricultural or native sagebrush and grasses. There are no trees on or around the site.

The Jensen farmstead and the Dygert log cabin are the only two historic properties considered eligible for listing on the NRHP within 1.5 miles of the site (see Figure 3.2 of this EA). The entire group of structures on the Jensen farmstead, which is 1.22 miles southeast of the CGS, is considered eligible because it forms an ensemble that is functional, traditional, and economically meaningful. The dwelling on the farmstead is approximately 75 years old and appears to be representative of the dry-farming homestead period of the early twentieth century. The setting of these farmstead structures is important for understanding the structures' historical significance in this rural Idaho landscape, and setting therefore would be important to the property's eligibility (Chance, 1990).

The Dygert log cabin, 0.47 mile northwest of the CGS, is a small one-room cabin probably built around 1920. As a representative structure associated with a particular historic time (the dry-farming period), the integrity of the cabin relies on the uncompromised rural Idaho landscape, and setting therefore would be important to the cabin's eligibility (Chance, 1990).

The nearest residential community is Rockford, 4 miles east of the site.

3.4 Alternative 3: Webb Site (CGS-14)

The Webb site is level. The Pancheri silt loam soil on the site has the same characteristics as the combination Pancheri-Polatis silt loam described in Section 3.1.1 of this EA.

The nearest surface water is the Rockford Canal 1.8 miles southeast. The site is on land used for potato cultivation, and the surrounding vegetation is agricultural or native sagebrush and grasses. There are no trees on or around the site.

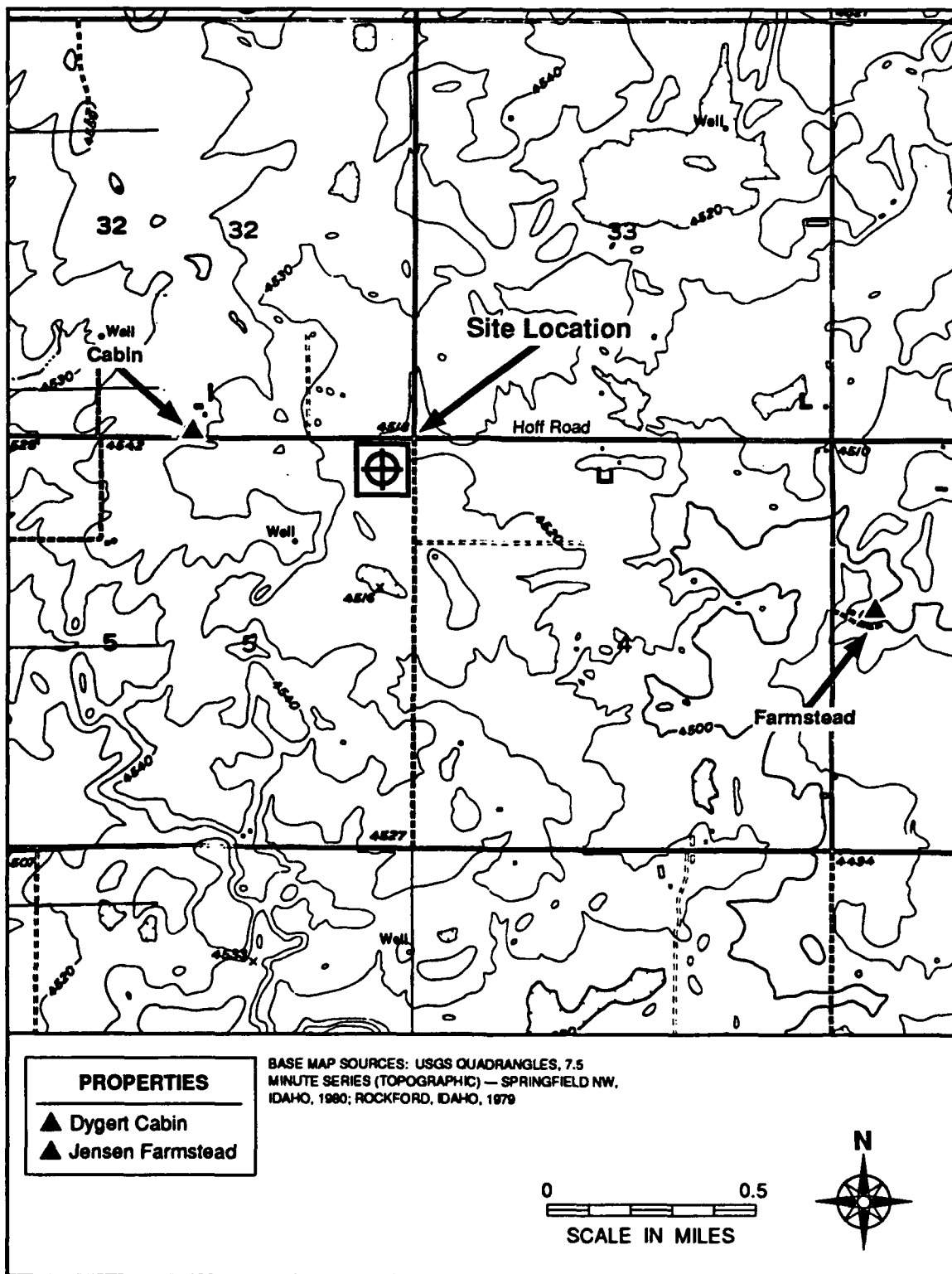


FIGURE 3.2 LOCATIONS OF PROPERTIES ELIGIBLE FOR LISTING ON THE NATIONAL REGISTER OF HISTORIC PLACES WITHIN 1.5 MILES OF THE KELLY SITE (CGS-10)

The nearest residential community is Pingree, approximately 5.1 miles southeast of the site.

3.5 Alternative 4: Watt Site (CGS-15)

The Watt site is level. The Pancheri silt loam soil on the site has the same characteristics as the combination Pancheri-Polatis silt loam described in Section 3.1.1 of this EA.

The nearest surface water is the Rockford Canal 1.7 miles southeast. This site is on land used for potato cultivation, and the surrounding vegetation is either agricultural or native sagebrush and grasses. There are no trees on or around the site.

The nearest residential community is Pingree, approximately 5 miles southeast of the site.

3.6 Alternative 5: Murdock Site (CGS-22)

The Murdock site is level. The Pancheri silt loam soil on the site has the same characteristics as the combination Pancheri-Polatis silt loam described in Section 3.1.1 of this EA.

An intermittent stream runs through the northeastern corner of the site and handles rainwater runoff. This corner is also identified as being within a 100-year floodplain (FIA, 1979). However, the access road, tower, and equipment enclosures at this site are outside of the floodplain (see Figure 3.3 of this EA).

This site is on land used for potato cultivation, and the surrounding vegetation is either agricultural or native sagebrush and grasses. There are no trees on or around the site.

The nearest residential community is Rockford, approximately 2.8 miles southeast.

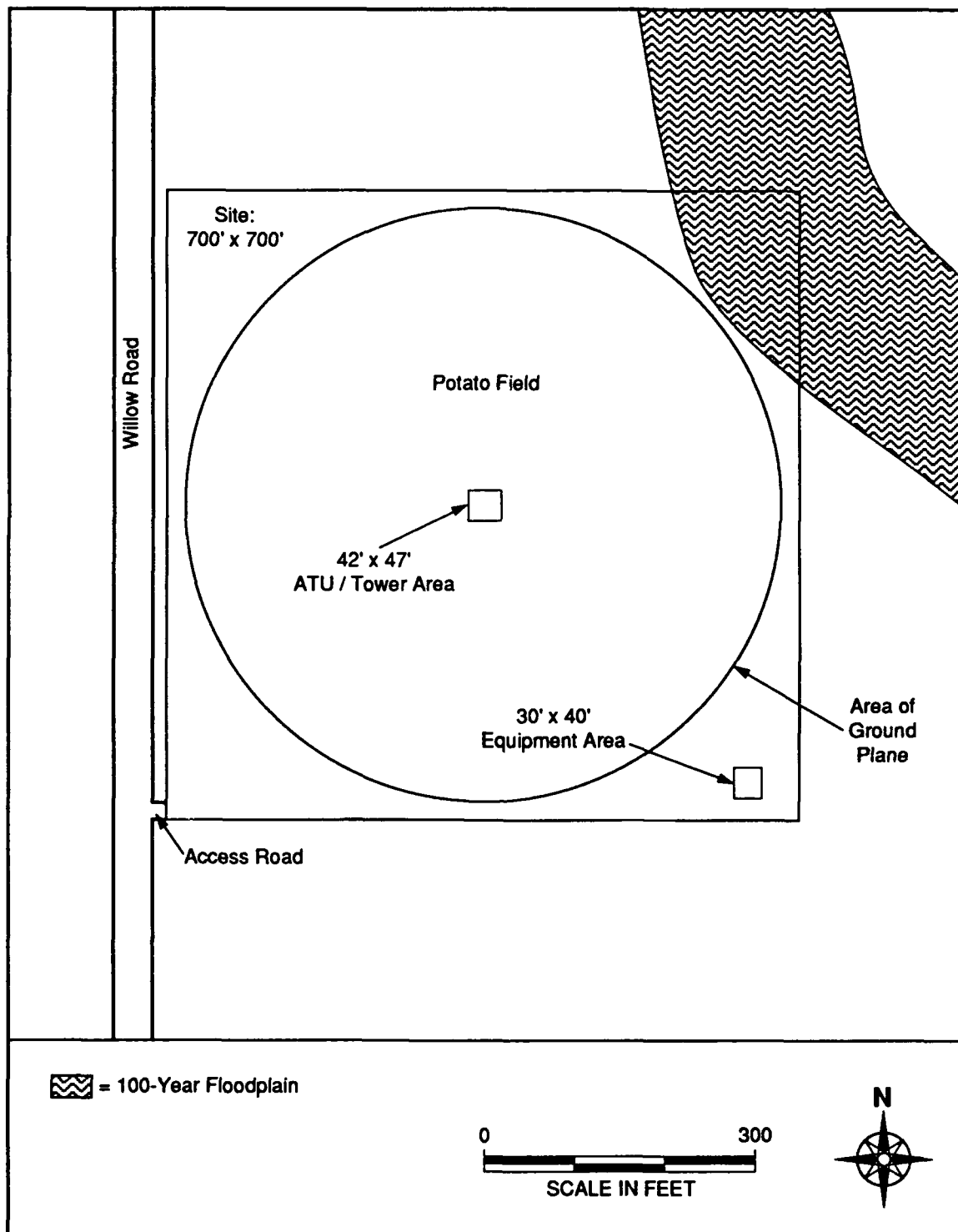


FIGURE 3.3 APPROXIMATE LOCATION OF 100-YEAR FLOODPLAIN AT THE MURDOCK SITE (CGS-22)

3.7 Alternative 6: Jensen Site (CGS-23)

The Jensen site is level. The combination Pancheri-Polatis silt loam soil on the site is described in Section 3.1.1 of this EA.

The nearest surface water is an intermittent stream approximately 0.5 mile southeast of the site. A small wetland area is 0.5 mile east. This site is on land used for agricultural cultivation, and its southeast quadrant has patches of loose lava rock that have been avoided during cultivation. The surrounding vegetation is either cultivated potatoes and winter wheat or native sagebrush and grasses. There are no trees on or around the site.

The nearest residential community is Rockford, 9 miles southeast of the site.

4.0 ENVIRONMENTAL CONSEQUENCES OF ACTION ALTERNATIVES

This section discusses the potential impacts of the GWEN project on the environmental setting of the six CGSs in southeastern Idaho. Several impacts that would be common to some or all of the action alternatives are discussed in Section 4.1 of this EA. Impacts that are unique to each action alternative are discussed in Sections 4.2 through 4.7 of this EA. Impacts on historic properties and visual impacts to travel routes leading to historic properties would be significant at the Bingham County (CGS-2) and Kelly (CGS-10) sites, as discussed in Sections 4.2 and 4.3 of this EA. There would be no significant impacts on the other four sites, as discussed in Sections 4.4 through 4.7 of this EA.

4.1 Common Features

Presented below is information on the physical, biological, and socio-cultural impacts common to some or all of the action alternatives.

4.1.1 Physical

Impacts from **construction** activities would not be significant. Construction would require localized earth-moving, including excavation and backfilling for placement of foundations and guy-wire anchors. Less than 3,800 square feet would be covered with concrete and gravel for the tower base and the equipment area enclosures. Similar coverage would be required for on-site access roads and parking; incidental activities during construction would disturb a similar amount. In total, about 0.25 acre would be occupied by foundations and the on-site access roads. Construction of the off-site access road and installation of utility lines would have no significant impacts because they would cover no more than 408 square feet of land along the previously graded public highway right-of-way.

The ground plane would be installed using machines that bury wire approximately 1 foot below the surface with minimal disturbance of the soil surface. This process would require moving a small tractor or similar equipment over much of the 11-acre site, but it would not significantly disturb the existing vegetation or create a significant erosion hazard.

Impacts to **mineral resources** would be minor, as indicated in Section 4.1.1.4, page 4.1-2 of the FEIS. In most cases, mineral resources were avoided in the siting process. No minerals or ore reserves of commercial value exist in Bingham County, but small quantities of gravel and sand are quarried in the SSA for highway and road construction (Johnstone, 1990). If any mineral resources were present under a site, development of that site would only deny access to a small portion of those resources for the lifetime of the project and would not result in any significant impact.

Significant impacts on **paleontological resources** are not anticipated because fossils are unlikely to occur on any of the CGSs (Akerston, 1990). However, if any fossils are found during construction, work that might affect them will be suspended while the Southeastern Idaho Regional Archaeological Center in Pocatello is notified and the significance of the find is evaluated.

Erosion and increase in storm water runoff would not be significant. All sites have slopes of 2 percent or less, so any required grading to level the site would be minimal. In addition, standard measures for erosion control would be used during and after site construction, including replanting the site.

Approximately 0.5 acre of the northeastern corner of the Murdock site (CGS-22) is within a **100-year floodplain** (FIA, 1979). There would be no significant impacts, as discussed in Section 4.6 of this EA. No other CGSs lie within a 100-year floodplain (FIA, 1979).

No **prime farmland** would be removed from production for the project, because none of the sites contains designated prime farmland (SCS, 1973).

No significant impacts on **drinking water** are expected, as discussed in Section 4.2.1.1, page 4.2-3 of the FEIS. Corrosion of the ground plane is not anticipated to raise copper concentrations in any aquifer or surface water body by more than 20 micrograms per liter ($\mu\text{g/l}$). This represents 2 percent of the maximum allowable copper concentrations permitted by the Environmental Protection Agency (EPA) for raw water sources for potable water supply (EPA, 1985). The EPA Secondary Standard of 1 milligram per liter (mg/l) has

been adopted by Idaho (Idaho Department of Health and Welfare Rules and Regulations Section 01.2003-20).

Impacts on **surface water or wetlands** that support aquatic plants and animals are not expected. Potential impacts on surface water and wetlands could occur when the ground plane is less than 300 feet from surface water or wetlands, if the soil is acidic, or if the depth to the seasonally high water table is less than 3 feet from the ground plane (4 feet from the surface), as discussed in Section 4.2.4.1, page 4.2-7 of the FEIS. All of the CGSs are on alkaline soils (pH 7.9 to 9.0) with a depth to the seasonally high water table of greater than 5 feet below the soil surface. Under these conditions, the potential transport of copper away from the immediate area of the ground plane into surface water or groundwater is negligible. Therefore, even though there is an intermittent stream handling rainwater runoff on the Murdock site (CGS-22), there would be no impacts on surface water at any of the sites.

Impacts on **air quality** would not be significant. Temporary but insignificant increases in air pollutant emissions would occur during construction, primarily from greater use of heavy machinery than would be required in normal farming operations. During operation of the BUPG at 100 percent load, total yearly emissions from the BUPG would be less than 350 pounds per pollutant, as described in Section 2.1.2 of this EA. These are well below the standards set by the Clean Air Act (42 USC 7401, *et seq.*), which requires permits for facilities emitting any single regulated substance at the rate of 50 tons per year. Hence, the project would not result in a violation of National Primary and Secondary Ambient Air Quality Standards, which have been adopted by the State of Idaho (Idaho Air Pollution Control Regulations, Title 1, Chapter 1, 01.1001).

4.1.2 Biological

Impacts on **wildlife habitat** would not be significant. All the CGSs are used for agricultural purposes and have been extensively cultivated in the past. Further, as stated in Section 3.1.2 of this EA, none of the sites contains or is within 300 feet of a wetland, based on soils data, field investigations, and wetlands maps provided by the USFWS. Consequently, no critical or exceptionally valuable wildlife habitats would be at risk.

Bird collisions with the tower may occur but are not expected to be significant. Section 4.4.1.5, page 4.4-5 of the FEIS states that most bird collisions occur with towers more than 300 feet tall or in adverse weather conditions when visibility is poor and birds may be forced to lower their flight level (Avery *et al.*, 1980). The GWEN tower is less than 300 feet tall, and visibility is generally good in the SSA (two out of three days are clear) (DOE, 1980). Areas with high concentrations of bird flight activity, such as feeding and nesting habitats, prominent topographical features that could serve as navigational aids, known migration corridors, and raptor roosting areas, were avoided.

No federally listed **threatened or endangered species** would be affected. This determination was made after informal consultations with the USFWS in compliance with Section 7 of the Endangered Species Act of 1973, as amended (16 USC 1531, *et seq.*, at 1536). The USFWS determined that no threatened or endangered species are found in the project area (Appendix C, Lobdell, 1990, pages C-3 to C-9 of this EA; Appendix C, Lobdell, 1992, pages C-14 to C-16 of this EA). No impacts are expected on the pygmy rabbit, the one candidate for federal listing. The sagebrush habitat for the pygmy rabbit is absent from all of the CGSs, which are all cultivated fields of alfalfa or potatoes. Pygmy rabbits are, therefore, not likely to burrow or forage on the sites, although they could be in the general areas of the sites, which are surrounded by a combination of agricultural fields and sagebrush and other desert vegetation.

Although the IDFG noted that one bald eagle roosting site was recorded in Bingham County, at the junction of the Blackfoot and Snake rivers, and that the eagle could occur within the SSA, the USFWS confirmed that the eagle was unlikely to occur near the CGSs and concurred that the project would not affect the bald eagle (Appendix C, Lobdell, 1991, page C-10 of this EA). No plant or animal species listed by the State of Idaho as rare, threatened, or endangered would be affected (Conley, 1990).

4.1.3 Socio-Cultural

Local employment would be increased slightly, primarily through use of local subcontractors for earth-moving and possibly for some of the facility's maintenance.

Impacts on **community support systems** would not be significant because the relay node will be unmanned and will use modest amounts of power, comparable to that used by an average single-family house. Security needs will be met through agreements with local police officials to monitor the integrity of the site during routine patrols, as detailed in Section 4.6.1.1, page 4.6-1 of the FEIS.

Impacts on **land use** would not be significant. All of the CGSs fall within agricultural zoning districts. Care was taken in the site selection process to maintain setbacks from institutional uses such as schools, churches, recreational areas, and areas zoned residential. Section 4.7.1.3, page 4.7-8 of the FEIS concluded that the tower would not significantly affect property values because non-noxious, nonresidential land uses, such as the proposed relay node, have no systematic effect on housing values.

Construction **noise** impacts would be temporary and insignificant. Operational noise from the back-up generator would be less than 72 dBA at the site boundary. At 50 feet beyond the site boundary the noise level would drop below 65 dBA, as discussed in Section 2.1.2 of this EA. Although Bingham County has no noise ordinances, this noise level is within the standards typically set for residential and mixed residential/agricultural use (55 to 65 dBA), as stated in Section 3.5.3, page 3.5-2 of the FEIS. In addition, the BUPG would only operate at this noise level for 2 hours per week during testing and during commercial power outages.

Impacts on **public health and safety** would not be significant, as discussed in Sections 4.11 and 4.12, beginning on pages 4.11-1 and 4.12-1, respectively, of the FEIS. Shock and burn risks would be associated with the buildup of electrical charges on ungrounded metallic objects inside the inner exclusionary (8-foot) fence located approximately 20 feet from the tower base. However, a grounded person within the outer exclusionary (4-foot) fence located approximately 330 feet from the tower base who touches an ungrounded object while the tower was transmitting would experience only a mild shock, sufficient to cause the individual to break contact but not cause harm. Furthermore, because the transmission periods would total between 6 and 8 seconds per hour during normal operations, the risk of even these mild shocks would be insignificant.

Only a determined effort to enter the inner exclusionary zones, within the 8-foot fence, would put a person at increased risk of higher shock and a higher specific absorption rate, dependent on the period of prolonged grasping contact with an ungrounded metallic object. Fire hazards at the relay node facility would be low, as discussed in Section 4.12.1.1, page 4.12-1 of the FEIS. Radio-frequency emissions would not cause adverse health effects, as discussed in Section 4.4.1.6, pages 4.4-6 and 4.4-7 of the FEIS. Subsequent to the publication of the FEIS, further study confirmed the conclusion of the FEIS that there is no evidence of adverse effects of GWEN radio-frequency emissions on public health (NRC, 1992).

The relay node would operate in the LF band and therefore would not interfere with pacemakers, emergency communications, commercial and amateur radios, televisions, or garage door openers, as noted in Section 2.1.1.1, page 2-3 of the FEIS.

Impacts on **archaeological resources** would not be significant. The Phase I on-site archaeological survey revealed no archaeological resources on any of the CGSs (Chance, 1990). If any archaeological resources are found during construction, work that might affect them will be suspended while the Idaho SHPO is notified in accordance with the provisions of 16 USC 470, *et seq.*, at 470f. The Idaho SHPO concurs with this determination (Appendix C, Watts, 1991, page C-13 of this EA).

Impacts on **historic properties** would be significant if the Bingham County (CGS-2) or Kelly (CGS-10) site were selected, based on the historic structures reconnaissance survey (Chance, 1990). The northern alternate of Goodale's Cutoff, a shortcut of the Oregon Trail, is eligible for listing on the NRHP and is within 1.5 miles of the Bingham County (CGS-2) site. Two historic properties that are eligible for listing on the NRHP are within 1.5 miles of the Kelly site (CGS-10). These impacts are discussed in Sections 4.2 and 4.3 of this EA. Impacts on historic properties would not be significant at the remaining four CGSs. The Idaho SHPO concurs that a tower at CGS-2 or CGS-10 would adversely affect historic properties listed or eligible for listing on the NRHP; they concur that there would be no effect to historic properties at any of the other CGSs (Appendix C, Watts, 1991, page C-13 of this EA).

Significant impacts on **Native American traditional, religious, or sacred sites** are not anticipated. At the recommendation of the BIA and Idaho SHPO, the Shoshoni-Bannock tribe in Fort Hall, Idaho was notified, the GWEN project was explained, and information was requested regarding traditional, religious, or sacred sites located within the SSA. The tribe's environmental coordinator determined that the construction of a GWEN facility on any of the six CGSs would not be likely to have an impact on Native American resources or significant religious grounds in the area (Albrecht, 1991).

Visual impacts associated with a GWEN tower are discussed in Sections 3.8 and 4.8, pages 3.8-1 and 4.8-1, respectively, of the FEIS. The significance of a visual impact would depend on the visual dominance of the GWEN facility and the sensitivity of the affected views. Visual dominance is the degree to which a GWEN facility would compete with other features of the existing landscape for the attention of the viewer. Section 3.8.4, beginning on page 3.8-3 of the FEIS defines four levels of dominance, called Visual Modification Classes (VMC):

- VMC 1, not noticeable: the tower would be overlooked by all but the most interested viewers
- VMC 2, noticeable, visually subordinate: the tower would be noticeable to most viewers without being pointed out but would not compete with other features for their attention
- VMC 3, distracting, visually codominant: the tower would compete with other features in the landscape for the viewer's attention
- VMC 4, visually dominant, demands attention: the tower would be the focus of attention and tend to dominate the view.

Visual sensitivity is a measure of the public's reaction to a proposed change of the affected view and is a function of the viewer's activity, awareness, goals, and values. Consequently, the more sensitive the view, the stronger will be the public reaction to any alteration of it. Areas defined in the FEIS as having high visual sensitivity include national and state parks; designated scenic routes; designated national, state, or local historic sites where setting is important to their historic significance; and travel routes providing primary access to these sites. Examples of areas having medium visual sensitivity would be locally popular, but undesignated, beaches or public use areas, and the travel routes that provide primary access to them. Travel routes that pass near or provide access to high sensitivity views, such as historic properties, but primarily serve other destinations are considered medium sensitivity. Travel routes are considered sensitive on segments within 0.5 mile of the property and 1.5 miles of the tower, based on FEIS criteria and review by visual analysis specialists (Duffey, 1991). Low visual sensitivity includes those views from sites, areas, travel routes, and sections of travel routes not identified as medium and high in sensitivity.

Significant visual impacts would occur if the relay node facility were to dominate or codominate (VMC 4 or 3) a high-sensitivity view or dominate (VMC 4) a medium-sensitivity view. If the relay node facility cannot be seen from medium-to-high sensitivity routes or areas, then visual impacts are not considered significant. Distance is the primary factor in determining visual dominance and therefore visual impacts. At distances greater than 3 miles, a GWEN tower would not be visible to the unaided eye. At 1.5 to 3 miles, the tower would be visually subordinate if noticeable (VMC 2) but more usually would not be noticed (VMC 1) because of its grey color and lack of mass. If a viewer at this distance actively sought the tower, it would appear as a thin vertical line on the horizon. Within 1.5 miles, the tower becomes a more important component of the view. In addition, other aspects of the tower's setting, such as focal point sensitivity, skyline complexity, competing feature interest, and topographic and vegetative screening, become important considerations in determining the level of visual impact.

USGS topographic maps and a windshield survey were used to determine whether high or medium sensitivity views were within 1.5 miles of the CGSs. The visual impacts associated with each site are discussed in Sections 4.2 to 4.7 of this EA.

4.2 Alternative 1: Bingham County Site (CGS-2)

Significant impacts are expected.

Impacts on **historic properties** would be significant. The northern alternate of Goodale's Cutoff of the Oregon Trail begins 1,200 feet northwest of the site and is eligible for listing on the NRHP. As discussed in Section 3.2 of this EA, the setting of this property would be important to its eligibility and therefore it is considered high sensitivity. The topography between the CGS and the trail is nearly level and no vegetation of significant height exists to screen the tower. The power line poles provide some competing feature interest, but the proximity of the tower would cause it to be dominant (VMC 4), creating a significant impact.

Visual impacts to travel routes leading to this historic property would be significant. The segment of Sunset Road that is within 0.5 mile of Goodale's Cutoff and within 1.5 miles of the tower is considered to have medium sensitivity because it passes near a designated area of interest while primarily serving other destinations. For a motorist traveling south on Sunset Road, the area where the trail is located would be in the same field of view as the tower for approximately 0.5 mile. There is no focal point sensitivity, but the lack of intervening vegetation or topography to screen the tower would make it dominant (VMC 4). For a motorist traveling north on Sunset Road, the tower and the area of the trail would be in the field of view until the tower is passed. Again, there is no focal point sensitivity, but the tower is directly adjacent to the road with no intervening vegetation or topography to provide screening. The tower would therefore be dominant in the view (VMC 4), creating a significant visual impact from either direction.

There are no other high or medium sensitivity views within 1.5 miles of the site.

4.3 Alternative 2: Kelly Site (CGS-10)

Significant impacts are expected.

Impacts on **historic properties** would be significant. The Dygert log cabin 0.47 mile west of the site is eligible for listing on the NRHP. As discussed in Section 3.3 of this EA, setting is important to its eligibility, and therefore it is considered high sensitivity. A sparse windbreak of trees just beyond the cabin, between the cabin and the tower, provides some vegetative screening to the lower third of the tower, but the skyline complexity is low. There is no focal point sensitivity, but the short distance between the cabin and the tower would make the upper part of the tower visually dominant (VMC 4), causing a significant impact.

The Jensen farmstead 1.22 miles southeast of the site is also eligible for listing on the NRHP; setting is important to its eligibility so it is considered high sensitivity. A line of poles along a fencerow that runs southwest in the view toward the tower provides some competing feature interest. There is no focal point sensitivity or vegetative or topographic screening. Skyline complexity is low. The tower would be visually distracting and codominant (VMC 3), creating a significant impact.

Visual impacts to travel routes leading to the Dygert log cabin would be significant. Hoff Road is considered a medium sensitivity view because it leads from the CGS to the Dygert log cabin, although it primarily serves other destinations. The tower is only 367 feet south of the road and would dominate the view (VMC 4) for a motorist traveling toward the Dygert property.

There are no other high or medium sensitivity views within 1.5 miles of the site.

4.4 Alternative 3: Webb Site (CGS-14)

No significant impacts are expected.

Visual impacts would not be significant because there are no high or medium sensitivity views within 1.5 miles of the site.

4.5 Alternative 4: Watt Site (CGS-15)

No significant impacts are expected.

Visual impacts would not be significant because there are no high or medium sensitivity views within 1.5 miles of the site.

4.6 Alternative 5: Murdock Site (CGS-22)

No significant impacts are expected.

Impacts on **surface water** would not be significant because, even though an intermittent stream runs through the northeastern corner of the site, the soils are alkaline and the depth to the seasonally high water table is greater than 5 feet. No wetlands occur on the site, the soils are not hydric, and no hydrophytic vegetation occurs along the intermittent stream. As stated in Section 4.2.4.1, page 4.2-7 of the FEIS, under these conditions impacts from copper leachate would not be significant.

There would be no significant impacts at the Murdock site from being within a **100-year floodplain**. If this site were selected, the tower, access road, and equipment enclosures would be located outside of the 100-year floodplain (see Figure 3.3 of this EA). Existing grades and the integrity of the drainage would be maintained. Therefore, impacts from erosion, sedimentation, and surface runoff would not be significant.

Visual impacts would not be significant because there are no high or medium sensitivity views within 1.5 miles of the site.

4.7 Alternative 6: Jensen Site (CGS-23)

No significant impacts are expected.

Visual impacts would not be significant because there are no high or medium sensitivity views within 1.5 miles of the site.

4.8 No Action Alternative

No environmental impacts would result from adoption of the no action alternative.

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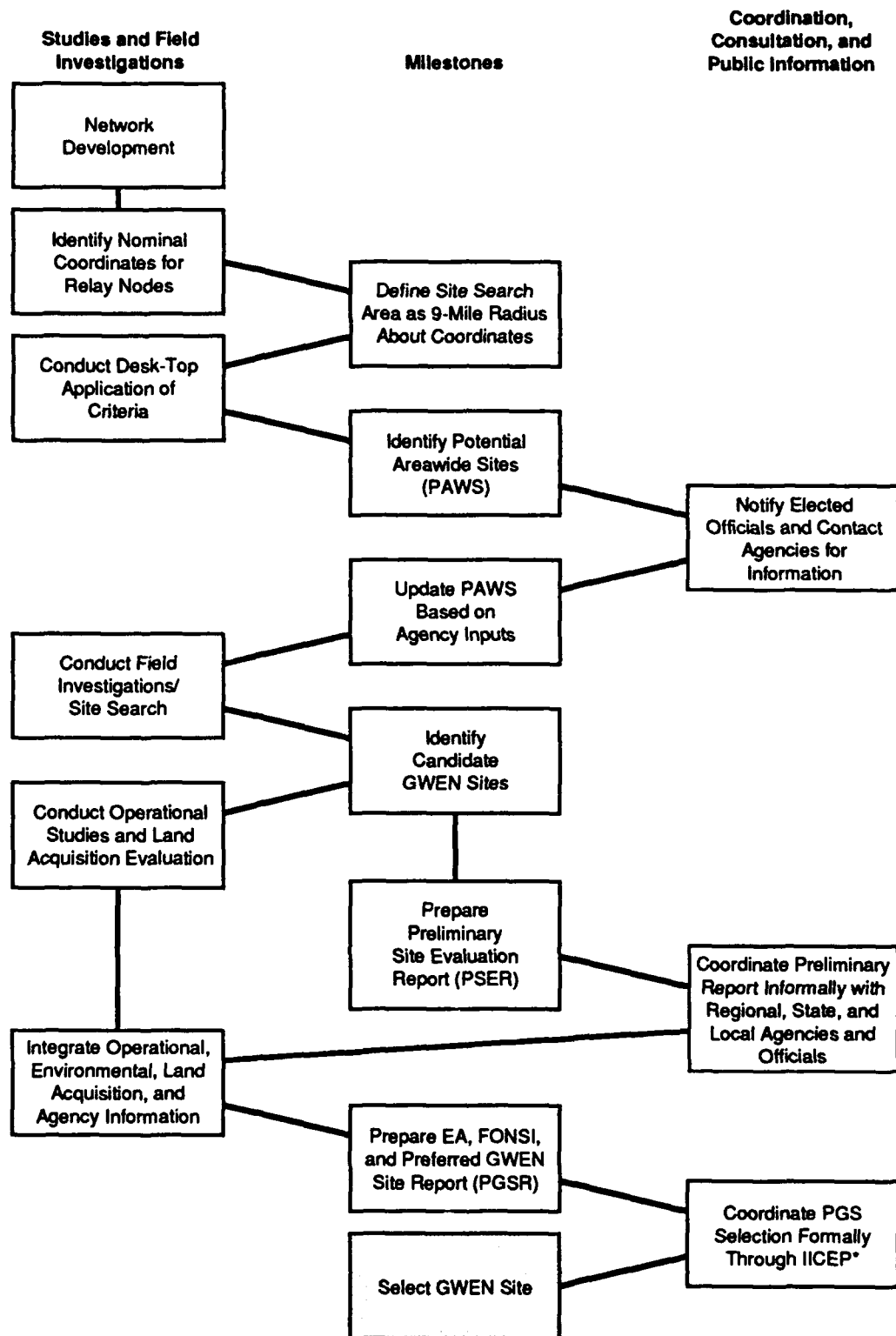
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APPENDIX A

SITE SELECTION PROCESS

SITE SELECTION PROCESS

Figure A.1 of this EA shows the sequence of events during the selection of individual GWEN sites. Figure A.2 of this EA describes the screening process used during the field investigation to choose the candidate GWEN sites (CGSs). The environmental siting criteria applied in the site selection process are defined in Tables 5-1 and 5-2, pages 5-7 through 5-14 of the FEIS.



*IICEP = Interagency/Intergovernmental Coordination for Environmental Planning.

FIGURE A.1 GROUND WAVE EMERGENCY NETWORK SITE SELECTION PROCESS

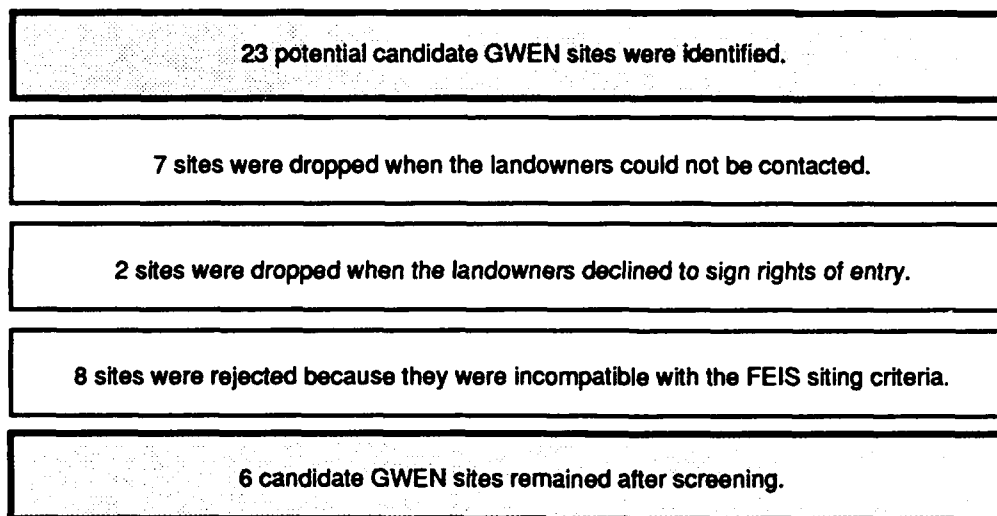


FIGURE A.2 RESULTS OF USING FEIS SITING CRITERIA TO
SCREEN POTENTIAL CANDIDATE GWEN SITES IN
THE SOUTHEASTERN IDAHO SITE SEARCH AREA

APPENDIX B

TOPOGRAPHIC SETTINGS OF CANDIDATE GWEN SITES

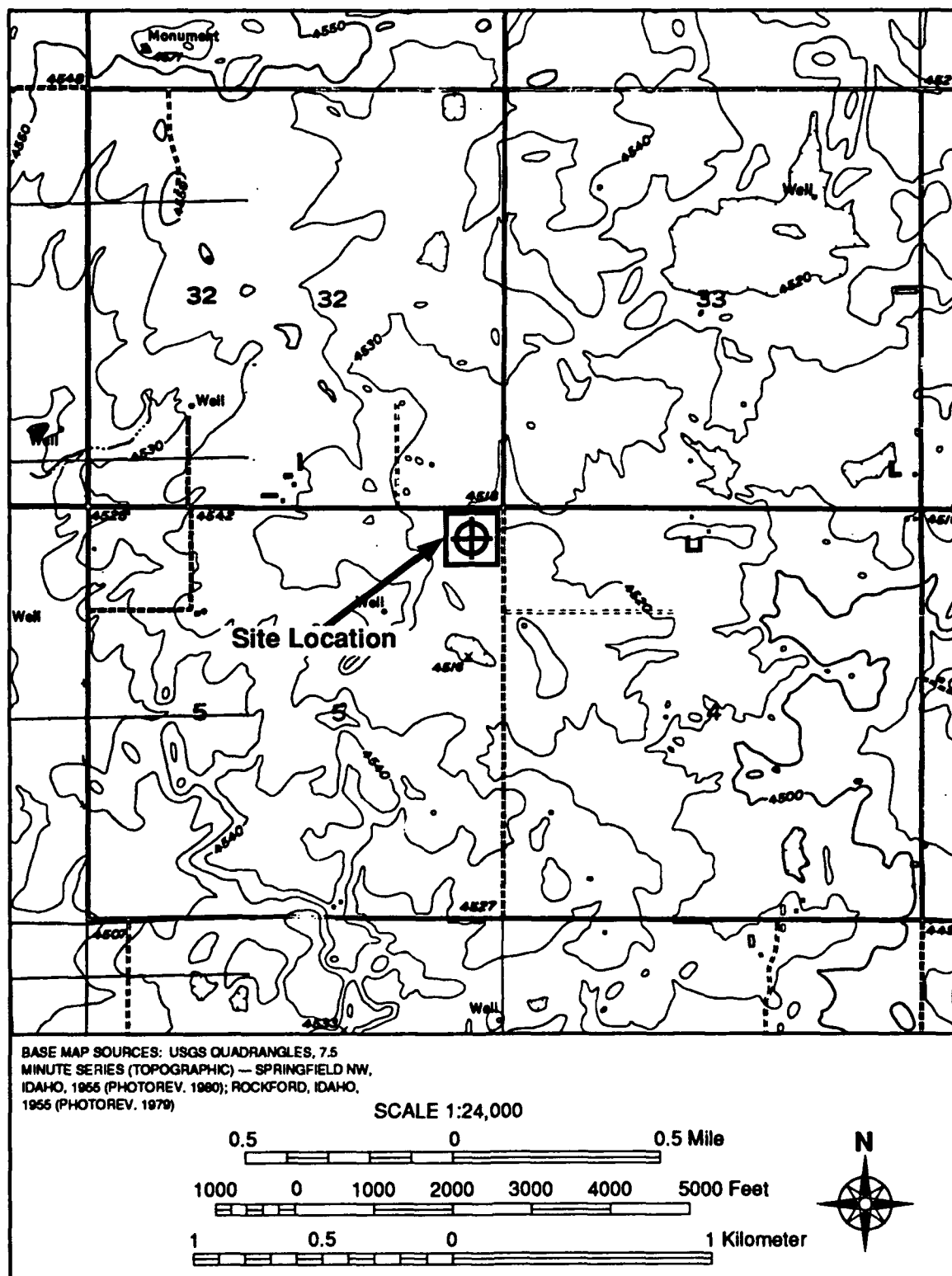


FIGURE B.2 TOPOGRAPHIC SETTING OF THE KELLY SITE (CGS-10)

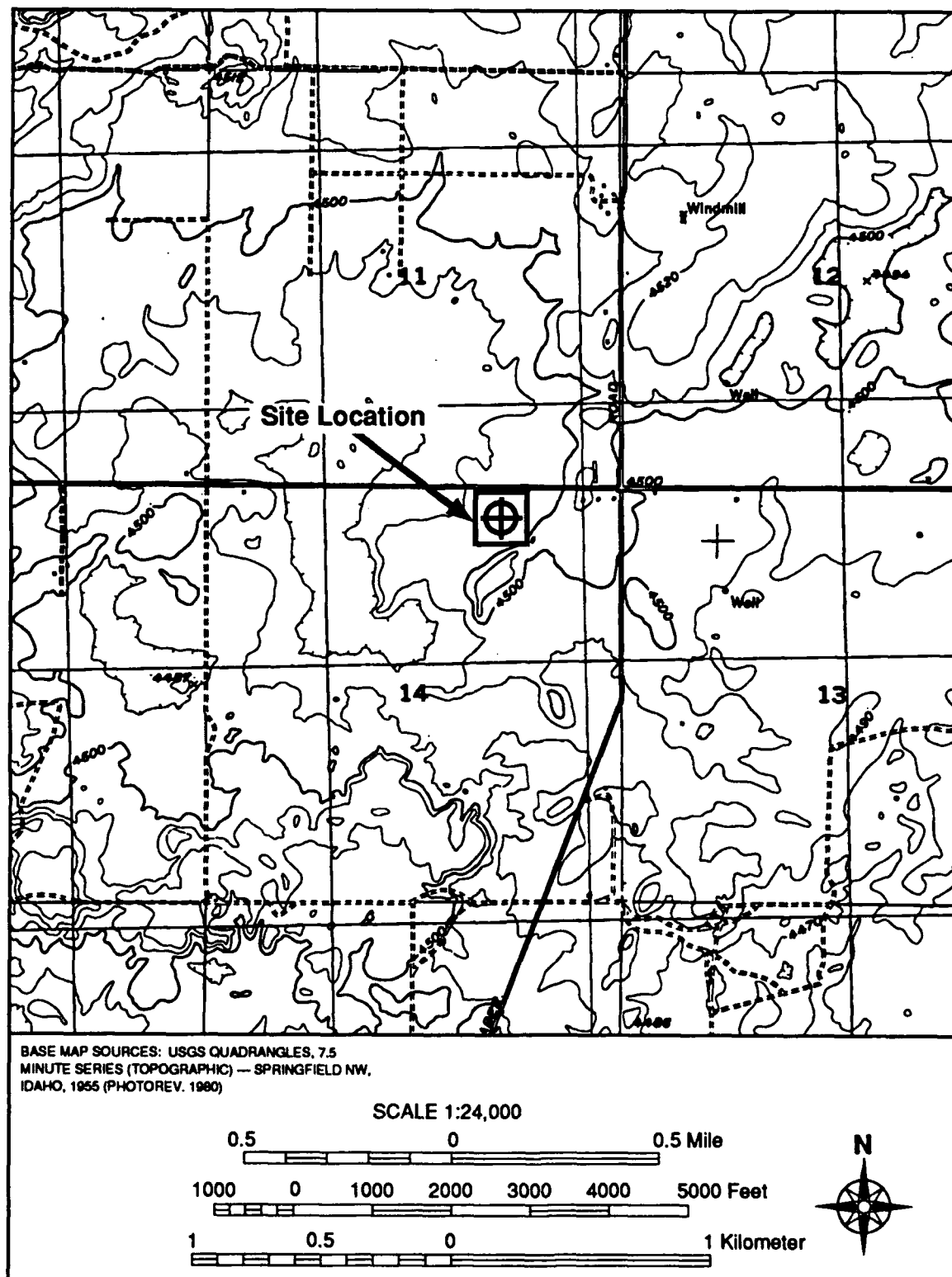


FIGURE B.4 TOPOGRAPHIC SETTING OF THE WATT SITE (CGS-15)

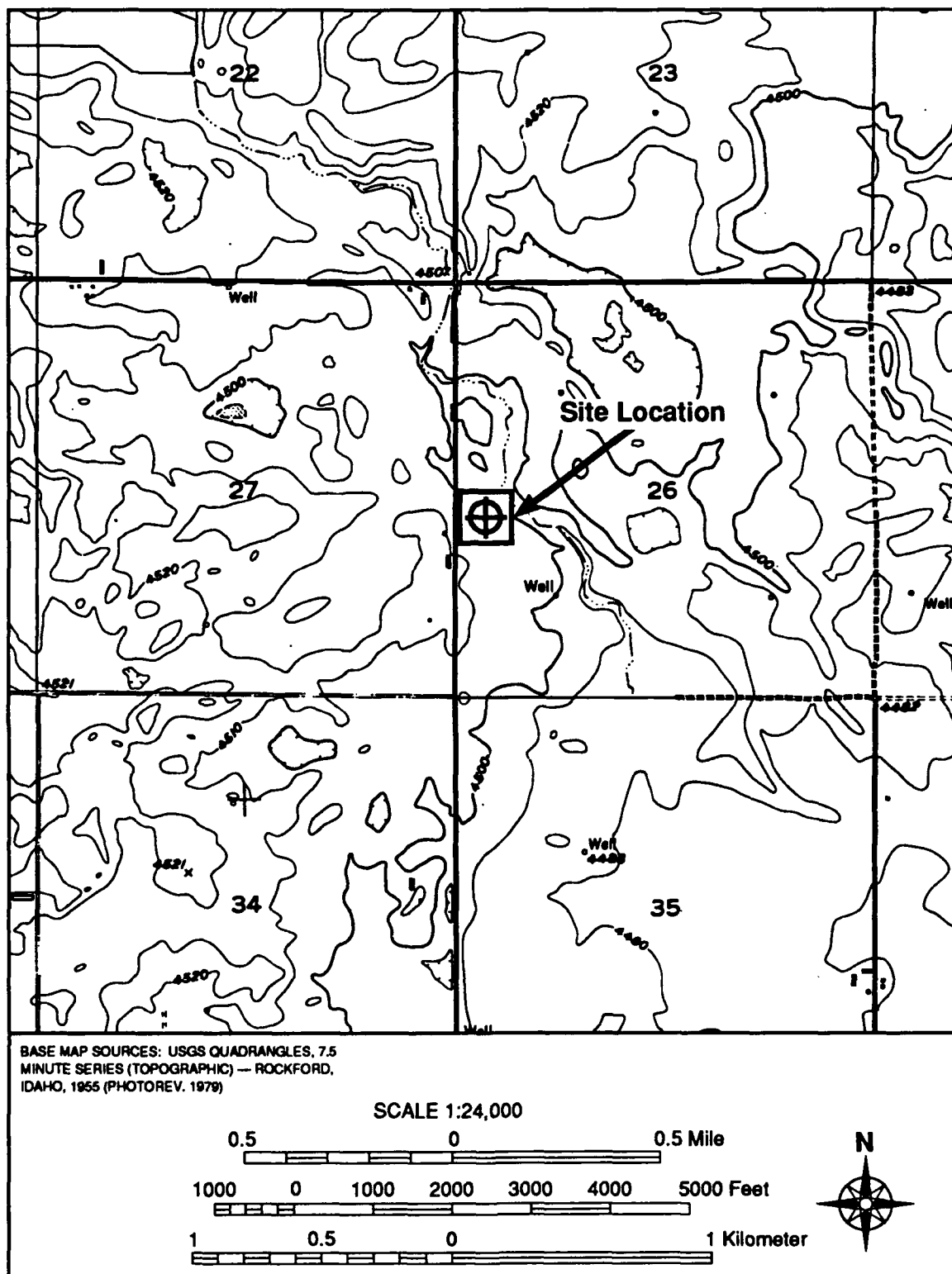


FIGURE B.5 TOPOGRAPHIC SETTING OF THE MURDOCK SITE (CGS-22)

APPENDIX C

CORRESPONDENCE

CORRESPONDENCE

Appendix C documents contacts with the following federal and state agencies and Native American groups:

<u>Individual</u>	<u>Agency</u>	<u>Date</u>	<u>Response</u>
Charles Lobdell, Field Supervisor	U.S. Department of the Interior, Fish and Wildlife Service, Boise Field Office	08-14-90	Attached
		09-14-90	Attached
		01-31-91	Attached
		05-26-92	Attached
		12-30-92	Attached
Thomas J. Green, Deputy State Historic Preservation Officer	Idaho State Historical Society	07-19-90	Attached
		09-04-90	Attached
Donald W. Watts, Deputy State Historic Preservation Officer	Idaho State Historical Society	03-15-91	Attached
Gilbert Teton, Chair	Shoshoni-Bannock Tribes, Fort Hall, Idaho	A letter was sent on 08-28-90. No written response has been received. Phone communication with C. Albrecht occurred on 01-31-91.	



United States Department of the Interior

FISH AND WILDLIFE SERVICE

BOISE FIELD OFFICE
4696 Overland Road, Room 476
Boise, Idaho 83705

August 14, 1990

Lt. Colonel Stephen T. Martin
Program Manager, GWEN
Department of the Air Force
Headquarters Electronic Systems Division
Hanscom Air Force Base, Massachusetts 01731-5000

Re: 1-4-90-SP-415 to 420 (GWEN Sites)
(SE File: 60Q370320)
(ES File: 200.0400)

Dear Colonel Martin:

We received your letter dated June 29, that requested a list of threatened and endangered species that may be present in the proposed sites for the Ground Wave Emergency Network (GWEN) in Bingham County, Idaho.

According to our records, no listed or proposed threatened or endangered, or candidate species are found near the project. However, if work is not initiated on this proposal within six months, regulations require that the Air Force should revalidate the species list every 180 days so you have the most current information. Thank you for your consideration.

Sincerely,

Charles H. Lobdell
Field Supervisor

cc: IDFG, Hdqtrs., Boise
IDFG, Region 5, Pocatello



United States Department of the Interior
FISH AND WILDLIFE SERVICE

BOISE FIELD OFFICE
4696 Overland Road, Room 576
Boise, Idaho 83705

September 14, 1990

Paul Kroupa
Environmental Consultant
SRI International
333 Ravenswood Avenue
Menlo Park, CA. 94025

Re: Air Force GWEN System
1-4-90-I-519
(6003.2200/3090)

Dear Mr. Kroupa:

We are writing in response to your letter sent to us August 28, 1990 regarding the Air Force's proposed radio communications tower candidate sites.

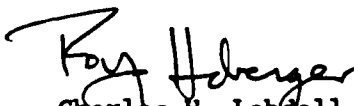
According to our files, a letter was sent by this office to the Air Force regarding threatened and endangered species in the proposed site locations. At that time, no listed or proposed threatened or endangered species were found (Attachment A). This letter completes the necessary endangered and threatened species requirements for this project.

We have also reviewed the candidate sites for wetland impacts (Attachment B) and do not see any potential problems with these sites.

Migrating birds, such as bald eagles and peregrine falcons, can be effected by electromagnetic changes. This problem, however, is not well understood and needs to be researched more carefully. We cannot, at this time, provide any recommendations or comments on this topic.

Thank you for your interest in these issues.

Sincerely,

For 
Charles H. Lobdell
Field Supervisor

Enclosures

This is a topographic map of a coastal region, likely in the Pacific Northwest. The map features a grid system with horizontal and vertical lines. Key geographical features include a coastline on the right side, a river or inlet labeled 'UNION' flowing from the top left towards the center, and a body of water labeled 'PACIFIC' at the bottom. Several locations are marked with dots and labels: 'PEMIA' (top center), 'PEMICH' (center), 'PUSA' (middle right), and 'BORROW PIT' (bottom right). Elevation points are indicated with numbers such as 4679, 4659, 4650, 4641, 4635, 4627, 4618, 4614, and 4603. A dashed line runs diagonally across the map, possibly representing a boundary or a specific contour. A small square symbol with a cross inside is located near the 'UNION' label. The map is oriented with 'NORTH' indicated by a dashed line at the top.

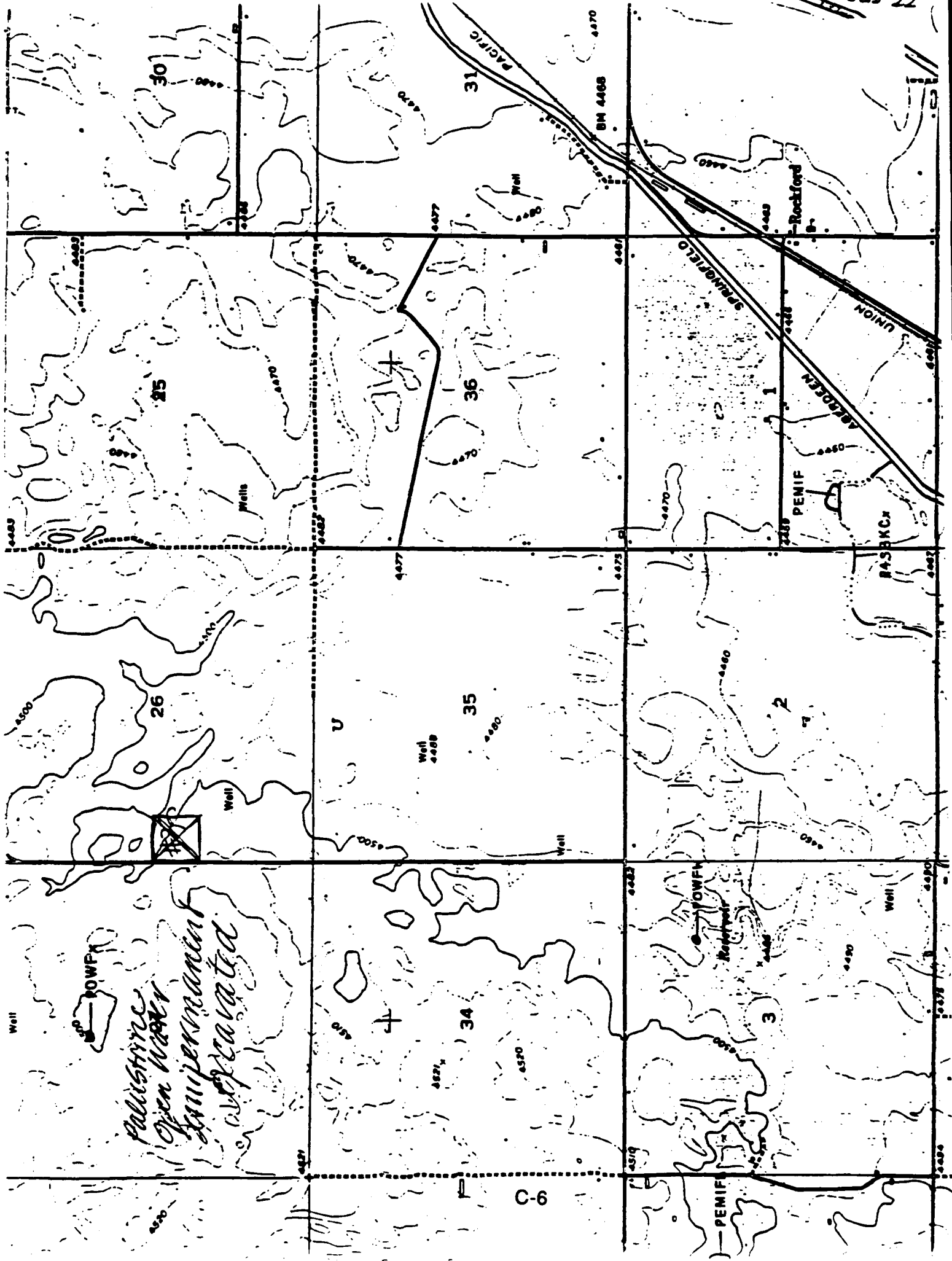
KEHHAx
Kaliustrin
Emergent
Persistent
Temperature
Exhausted

PELICH

... basaloid
impounded

FUSA
Palestine
Unconsolidated B
Sand
Temporary

C-5



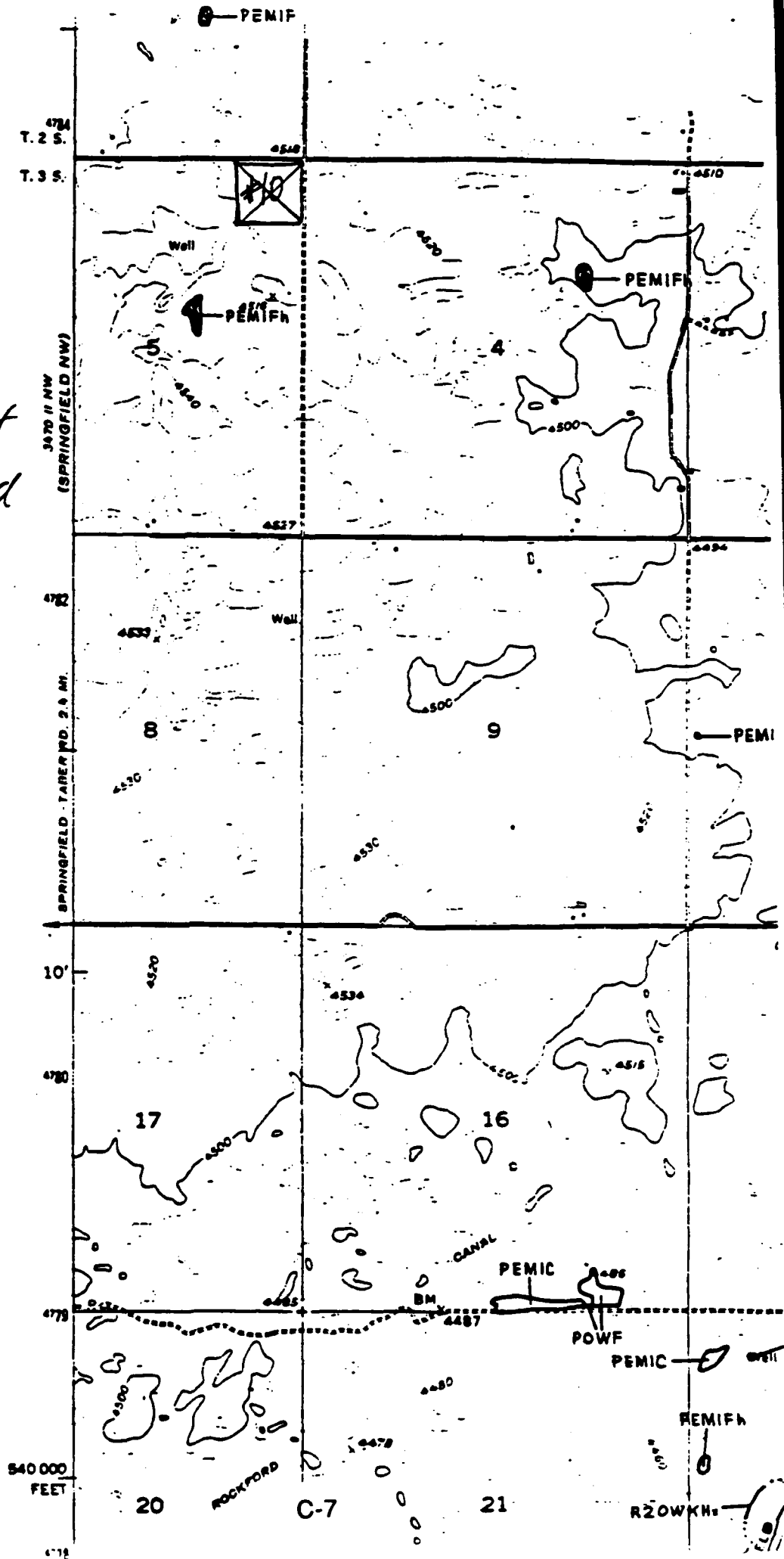
*Palisades
Open Water
Impervious
operated*

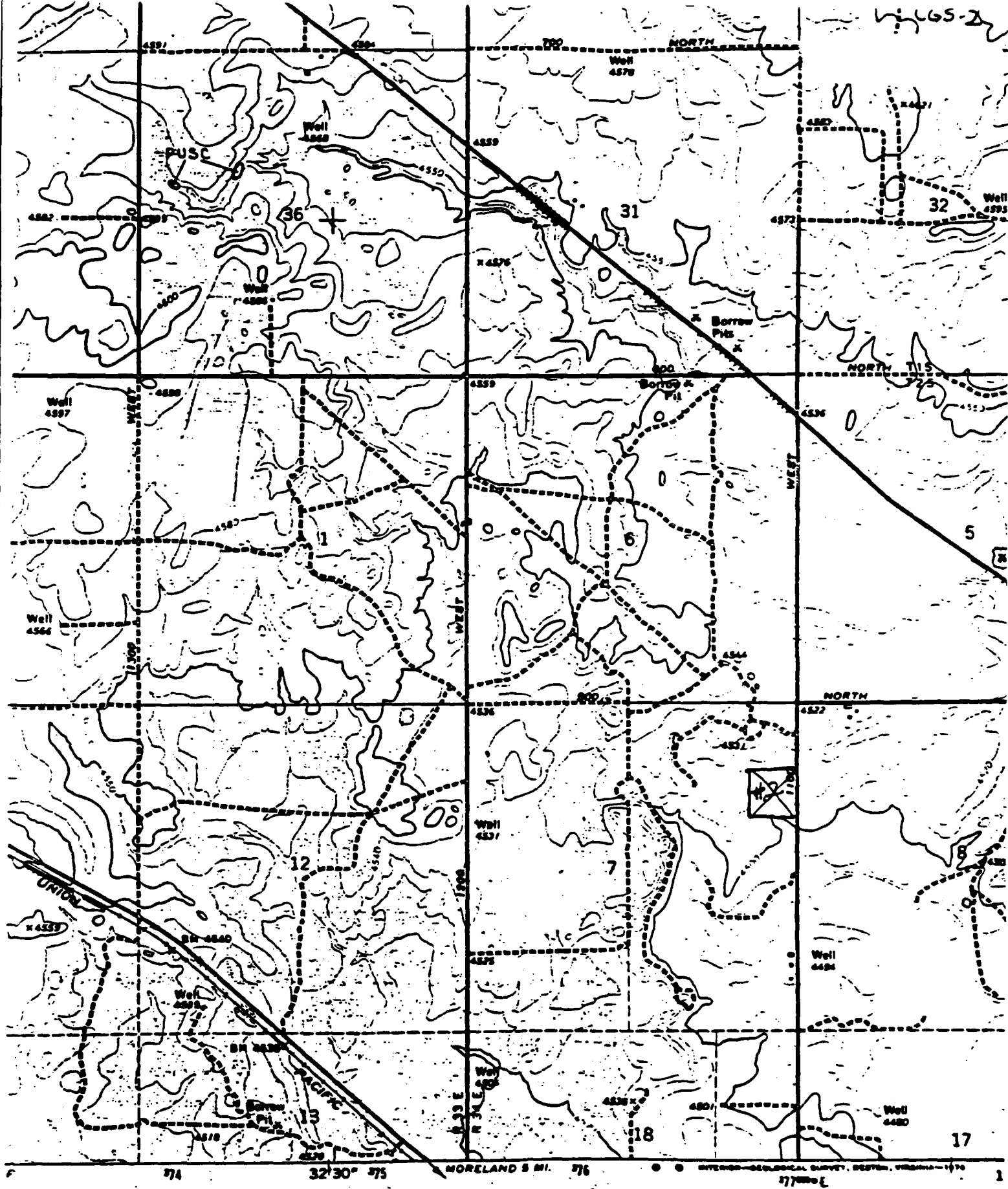
POWPK

C-6

CGS-10

*Palustrine
Emergent
Persistent
Scrub/Thicket
(h=impounded
or diked)*



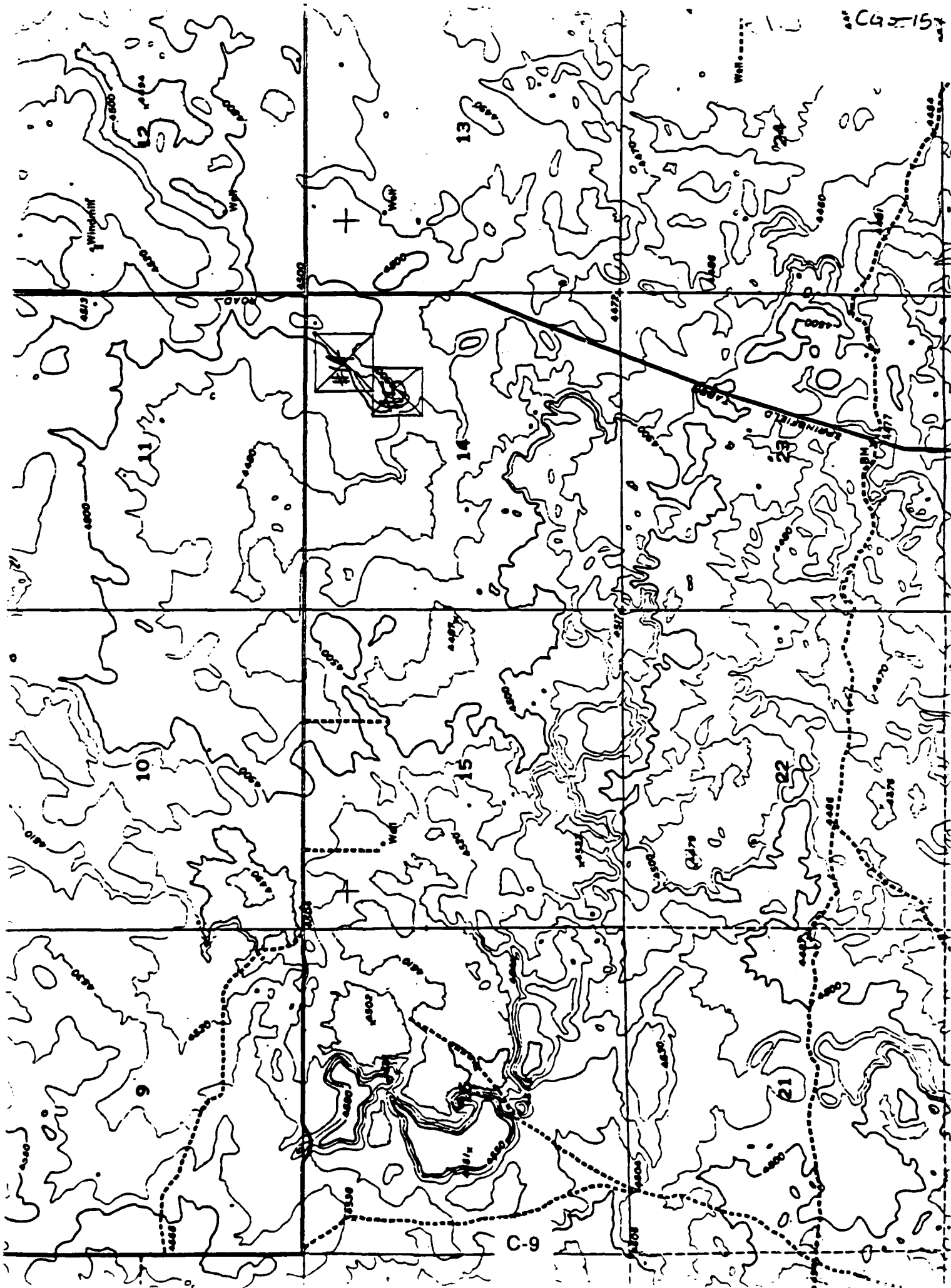


OLSSEN, IDA

C-8

NOTES TO THE USER

- Wetlands which have been field examined are indicated.





United States Department of the Interior

FISH AND WILDLIFE SERVICE

Boise Field Station
4696 Overland Road, Room 576
Boise, Idaho 83705

January 31, 1991

Paul Kroupa
Environmental Consultant
SRI International
333 Ravenswood Avenue
Menlo Park, California 94205

Re: GWEN Project
(6003.2200)

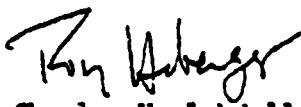
Dear Mr. Kroupa:

We are writing in response to your letter of January 25, 1991 requesting additional concurrence on bald eagles in your project area.

We stand behind our finding of no listed, threatened and/or endangered (T/E) species in the candidate GWEN sites. The issue of bald eagles has been raised as a result of possible discrepancies between Idaho Fish and Game (IDFG) and our assessment of T/E species present in the area. Jeri Williams, of our office, has contacted Dr. Dale Towell of IDFG to confirm our original assessment. They have agreed that Dr. Towell's assessment was pre-project site designation and encompassed a much broader area than our assessment. The currently proposed sites are far enough from the roost area, referenced in your letter, to not warrant their listing in your species list request (1-4-91-SP-415 to 420) to us.

We hope this clears the matter up and appreciate your interest in endangered species.

Sincerely,

For 
Charles H. Lobdell
Field Supervisor



IDAHO STATE HISTORICAL SOCIETY

CECIL D. ANDRUS, Governor

July 19, 1990

Dr. David L. Crowder
Director
210 Main St.
Boise, Idaho 83702
208-334-3890

Archaeology
210 Main St.
Boise, Idaho 83702
208-334-3847

Education
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Boise, Idaho 83702
208-334-2120

Genealogical Library
610 N. Julia Davis Dr.
Boise, Idaho 83702
208-334-2305

Historic Preservation
210 Main St.
Boise, Idaho 83702
208-334-3847, 3861

Library and Archives
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Boise, Idaho 83702
208-334-3356

Museum
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Boise, Idaho 83702
208-334-2120

Old Idaho Penitentiary
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Boise, Idaho 83712
208-334-2844

Oral History
210 Main St.
Boise, Idaho 83702
208-334-3863

Publications
610 N. Julia Davis Dr.
Boise, Idaho 83702
208-334-3428

Stephen T. Martin
Program Manager, GWEN
Department of the Air Force
Headquarters Electronic Systems Division
Hanscom Air Force Base, Massachusetts 01731-5000

RE: Ground Wave Emergency Network - Candidate Sites

Thank you for forwarding the Fact Sheet on the GWEN project for our review and comment.

While Goodale's Cutoff of the Oregon Trail is the only previously recorded historic property within the GWEN study area, other archaeological and historic sites are likely to exist which have not yet been identified. Therefore, we recommend an archaeological investigation be conducted prior to implementation of the project on any of the candidate sites.

Further, your statement is accurate that our office has no jurisdiction over historic properties, such as the Oregon Trail, on private property. However, as a federal agency, the Air Force is required to comply with Section 106 of the National Historic Preservation Act and regulations 36 CFR Part 800. Section 106 requires federal agencies to take into account the effects of their undertakings on historic properties on private as well as public land. Therefore, if site CGS-2 becomes the preferred location for the installation of GWEN, we would assess the effects of the undertaking on the integrity of the Oregon Trail, or any other historic properties, regardless of property ownership.

If you have any questions, please feel free to contact either myself or Suzi Neitzel at 208-334-3847.

Sincerely,

Thomas J. Green
Deputy State Historic
Preservation Officer

C-11

TJG/spn





IDAHO STATE HISTORICAL SOCIETY

CECIL D. ANDRUS, Governor

September 4, 1990

Dr. David L. Crowder
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210 Main St.
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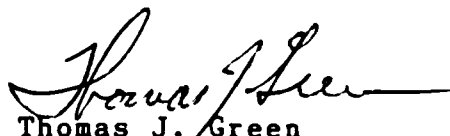
Paul Kroupa
Environmental Consultant
SRI International
333 Ravenswood Ave.
Menlo Park, California 94025

RE: Ground Wave Emergency Network - Bingham County, Idaho
United States Air Force

Enclosed are our comments of July 19, 1990, on the Environmental Assessment for the proposed Ground Wave Emergency Network (GWEN) radio communications systems site. As indicated in our comments, we recommend an archaeological survey of each CGS, and any other areas to be impacted by installation of the facility. The survey should be conducted by a professional archaeologist using the standard 30 meter transect interval to meet Secretary of Interior's standards for archaeological survey. Standing structures can also be recorded by the archaeologist(s) conducting the investigations. We prefer the survey be documented using the report format enclosed.

Thank you for your cooperation. If you have any questions, please feel free to contact either myself or Suzi Neitzel at 208-334-3847.

Sincerely,


Thomas J. Green
Deputy State Historic
Preservation Officer

TJG/spn

C-12





IDAHO STATE HISTORICAL SOCIETY

CECIL D. ANDRUS, Governor

March 15, 1991

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210 Main St.
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208-334-3863

Publications
610 N. Julia Davis Dr.
Boise, Idaho 83702
208-334-3428

Mr. Paul Kroupa
SRI International
333 Ravenswood Ave.
Menlo Park, California 94025

RE: Historic Preservation Review
Six Candidate GWEN Sites in Idaho

Thank you for forwarding the report documenting the cultural resources survey of six candidate Ground Wave Emergency Network Relay Mode (GWEN) sites in southeastern Idaho near Rockford. The investigations were conducted by David H. Chance of David and Jennifer Chance & Associates, Moscow, Idaho.

We agree that the Jensen and Dygert homesteads near CGS-10 and the segment of the Goodale Trail Cutoff near CGS-2 appear to be eligible for the National Register of Historic Places. Therefore, we feel the construction of the GWEN tower at sites CGS-2 and CGS-10 would have an adverse effect on the settings of the homesteads and the Trail. If one of these sites is preferred, further consultation will be necessary.

Because no historic properties were identified within or near the boundaries of sites CGS-14, CGS-15, CGS-22, and CGS-23, the GWEN tower can be constructed at these locations with no effect to properties listed in, or eligible for, the National Register of Historic Places. Our office should be notified immediately, however, if archaeological remains are unearthed during construction activities.

We appreciate your cooperation. If you have any questions, please feel free to contact either myself or Suzi Neitzel at 208-334-2847.

Sincerely,

Donald W. Watts
Deputy State Historic
Preservation Officer

DWW/spn

cc: David Chance, Moscow, Idaho



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Boise Field Station
4696 Overland Road, Room 576
Boise, Idaho 83705

May 26, 1992

Lt. Colonel Stephen T. Martin
Department of the Air Force
Program Manager, GWEN
Headquarters Electronic Systems Division (AFSC)
Hanscom Air Force Base, Massachusetts 01731-5000

Re: USAF/GWEN Sites
File #200.0400
(SP# 1-4-SP-477 to 482)

Dear Colonel Martin:

We received your letter dated April 23, 1992, that requested a list of threatened and endangered species that may be present in the proposed U.S. Air Force Ground Wave Emergency Network project area.

According to our records, no listed or proposed threatened or endangered, or candidate species are found near the project area. This updates a species list request from August 14, 1990, SP# 1-4-90-SP-415 to 420. However, if work is not initiated on this proposal within six months, regulations pursuant to the Endangered Species Act (Act) require that the Air Force should revalidate the species list every 180 days so you have the most current information. Thank you for your consideration.

Sincerely,

Charles H. Lobdell
Field Supervisor

cc: IDFG, Hdqtrs., Boise
IDFG, Reg. VI, Idaho Falls
SRI International, California (Paul Kroupa)

United States Department
of the Interior
Fish and Wildlife Service
Boise Field Station
Attn: Mr Charles H. Lobdell
4696 Overland Road, Room 576
Boise, ID 83705

RE: U.S. Air Force Ground Wave Emergency Network (GWEN) Project
in Southeastern Idaho

This is to verify that there are no federally-designated
threatened, endangered, or candidate species likely to be found
within the GWEN project area as stated in our letter of May 26,
1992.

Charles H. Lobdell

Date

Changes have been made to the list of federally-designated
threatened, endangered, or candidate species since our
correspondence to you on May 26, 1992. Enclosed is a new list of
species likely to be found in the GWEN project area and which may
be affected by the project.

For *X* *Tracy Hodge*
Charles H. Lobdell

12/30/92
Date



United States Department of the Interior



FISH AND WILDLIFE SERVICE
Boise Field Station
4696 Overland Road, Room 576
Boise, Idaho 83705

AS REQUESTED
LISTED AND PROPOSED ENDANGERED
AND THREATENED SPECIES, AND CANDIDATE
SPECIES, THAT OCCUR WITHIN THE DEPARTMENT OF THE AIR FORCE GWEN SITES PROJECT

DATE: December 30, 1992

PROJECT NAME: Department of the Air Force GWEN Sites Project

SPECIES LIST NO. FWS 1-4-93-SP-101 to 106 (200.0400)

LISTED SPECIES

COMMENTS

None

PROPOSED SPECIES

None

CANDIDATE SPECIES

Pygmy Rabbit (C2)
(Brachylagus idahoensis)

ALL SITES

GENERAL COMMENTS:

C2 = Category 2 Taxa for which information now in possession of the U.S. Fish and Wildlife Service indicates that proposing to list as endangered or threatened is possibly appropriate, but for which conclusive data on biological vulnerability and threat are not currently available to support proposed rules. Further biological research and field study may be needed to ascertain the status of taxa in this category.

APPENDIX D

GLOSSARY

GLOSSARY

Abbreviations and Units of Measure

AM	Amplitude Modulation
ATU	Antenna tuning unit
BIA	Bureau of Indian Affairs
Btu	British thermal unit
BUPG	Back-up power group
CGS	Candidate GWEN site
dBA	Decibels on the A-weighted scale, which is a measure of the intensity of the sounds people can hear
DOE	Department of Energy
EA	Environmental Assessment
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FEIS	Final Environmental Impact Statement; in this document, the term refers to the FEIS for the GWEN Final Operational Capability that was released in September 1987 by the U.S. Air Force, Electronic Systems Division, Hanscom Air Force Base, Massachusetts

FIA	Federal Insurance Administration
FICWD	Federal Interagency Committee for Wetland Delineation
FOC	Final Operational Capability, the third phase of development of GWEN
FONSI	Finding of No Significant Impact
GPO	Government Printing Office
GWEN	Ground Wave Emergency Network
HEMP	High-altitude electromagnetic pulse
IDC	Idaho Department of Commerce
IDFG	Idaho Department of Fish and Game
IICEP	Interagency and Intergovernmental Coordination for Environmental Planning, the formal review process for the EA
kHz	Kilohertz
LF	Low frequency
mg/l	Milligram per liter
MM	Modified Mercalli, a scale of the severity of earthquake effects
µg/l	Micrograms per liter

NRC	National Research Council, the principle operating agency of the National Academy of Sciences and the National Academy of Engineering
NRHP	National Register of Historic Places
PAWS	Potential areawide sites; the portion(s) of an SSA left after application of those siting criteria that do not require a field survey, such as the location of national and state parks
PCGS	Potential candidate GWEN site; any site that is identified from roadside surveys as suitable for further investigation
PGS	Preferred GWEN site; the CGS identified by the Government that represents the Government's preferred location for a relay tower
PSER	<i>Preliminary Site Evaluation Report</i>
SCS	Soil Conservation Service, a unit of the United States Department of Agriculture
SHPO	State Historic Preservation Officer; the person responsible for administering the National Historic Preservation Act at the state level, reviewing National Register of Historic Places nominations, maintaining data on historic properties that have been identified but not yet nominated, and consulting with federal agencies concerning the impacts of proposed projects on known and unknown cultural resources
SSA	Site search area; the 250-square-mile area within which four to six CGSs are identified; the SSA is the area within a 9-mile radius of a set of nominal coordinates in the network design. It is used as a manageable range in which to conduct siting investigations.

TLCC	Thin Line Connectivity Capability; the second phase of development of GWEN
UHF	Ultrahigh frequency (band); specifically 300 to 3,000 megahertz
USAF	United States Air Force
USC	United States Code
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VMC	Visual Modification Class

Definitions

Air pollutant	An atmospheric contaminant, particularly the 15 atmospheric contaminants specified in federal and most state regulations
Alluvial	Pertaining to loose river sediments, such as clay, silt, sand, and gravel
Anaerobic	Occurring in the absence of free oxygen
Basalt	A dark grey to black, dense to fine-grained igneous rock
Bottoms	Low-lying land along a watercourse

Candela	A unit of measure of the intensity of light equal to the brightness of one candle
Carboniferous	Geologic period of time from 360 to 286 million years ago during which most of the material that later became modern fossil fuels was deposited
Cenozoic era	Geologic period of time beginning about 66 million years ago and continuing into the present
Cultural resource	Prehistoric, Native American, and historic sites, districts, buildings, structures, objects, and any other physical evidence of past human activity
Disk	To cultivate with an implement that turns and loosens the soil with a series of disks
Evaluative criteria	Applied to portions of a potential siting area for a GWEN facility to determine its suitability. Areas that rank low against evaluative criteria may be excluded from consideration, or given a low priority in the site selection process
Exclusionary criteria	Criteria used to eliminate or exclude highly sensitive areas or areas that do not meet the limits of acceptable performance from consideration for GWEN facilities

Federal jurisdictional wetland	As defined in the <i>Federal Manual for Identifying and Delineating Jurisdictional Wetlands</i> (GPO 1989-236-985/00336), a wetland is a class of habitats distinguished by the presence of saturation to the surface or standing water during at least 1 week of the growing season (wetland hydrology), a soil type characteristic of saturated or poorly drained conditions (hydric soils), and the predominance of plants that only or mostly occur on wet sites (hydrophytic vegetation)
Floodplain	Land adjacent to a river which is commonly covered by water during high flow periods
Ground plane	A part of the antenna system consisting of buried copper wires that extend radially from the base of a GWEN tower for a distance of approximately 330 feet
Historic properties	For the purposes of this EA, historic properties are those above-ground structures and resources that are listed or eligible for listing on the National Register of Historic Places
Holocene	Geologic period of time from 1 million years ago to the present
Hydric soil	A soil that is saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part

Modified Mercalli scale	A measure of the intensity of seismic activity based on human perception of the event and the potential for damage; the intensity scale is rated on a Roman numeral scale ranging from I to XII. An earthquake of MM intensity I would be detectable only by seismographs; MM intensity V would shake buildings, break dishes and glassware, and cause unstable objects to fall; MM intensity X would destroy most masonry and frame structures, bend railroad rails slightly, and cause tidal waves and landslides; MM intensity XII would cause nearly total destruction of all buildings. Another commonly used seismic intensity scale, based on readings from a seismograph, is the Richter scale, which was developed in 1935. The Modified Mercalli scale is often used when the historic period to be covered includes data prior to 1935 damage
Paleontological	Pertaining to fossils or the study of fossils
pH	A measure of acidity in which the lower the number, the more acidic the substance; 7 represents neutrality
Phase I survey	A survey designed to identify properties that are listed, eligible for listing, or potentially eligible for listing on the National Register of Historic Places within the area that would be affected by the proposed project
Pleistocene epoch	Geologic period from 1.8 million to 10,000 years before present, which is characterized by several periods of glaciation
Prime farmland	Land that contains soils having high crop production either naturally or through modification; the U.S. Soil Conservation Service is responsible for designating prime farmland

Quaternary period	Geologic period of time 2 million to 5 million years ago
Raptor	A bird of prey
Sedimentary rock	Rock formed by the consolidation or cementation of particles deposited by water or wind
Top-loading element	Portions of the antenna that extend diagonally from the top of the tower, which strengthen the signal and provide additional structural support like guy wires